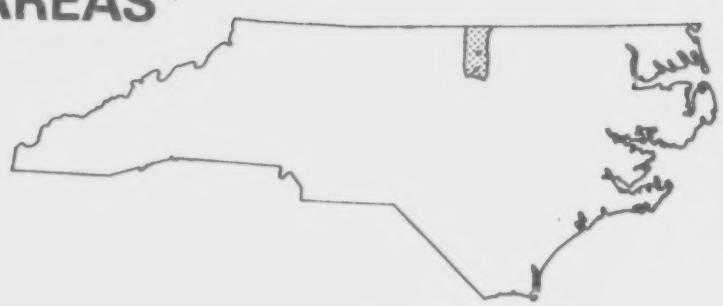
FLOOD INSURANCE STUDY

GRANVILLE COUNTY, NORTH CAROLINA AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
CREEDMOOR, CITY OF	370107
OXFORD, CITY OF	370108
STEM, TOWN OF	370109
UNINCORPORATED AREAS	370325

SEPTEMBER 28, 1990

Federal Emergency Management Agency

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

GRANVILLE COUNTY, NORTH CAROLINA
AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the geographic area of Granville County, North Carolina, including the Cities of Creedmore and Oxford, the Town of Stem, and the Unincorporated Areas of Granville County (hereinafter referred to collectively as Granville County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

This Flood Insurance Study revises and supersedes a previous Flood Insurance Rate Map for the City of Creedmoor (Reference 1). This information will be used by the community to update existing floodplain regulations as part of the regular phase of the National Flood Insurance Program. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers, Wilmington District (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-87-E-2509, Project Order No. 7. This study was completed in April 1988.

1.3 Coordination

On July 29, 1986, an initial coordination meeting was held in the City of Oxford, North Carolina, with representatives of FEMA, Granville County, and the Study Contractor. At this meeting, the nature and purpose of this Flood Insurance Study were explained, study streams were identified, and study limits were established. The methodology to be used in this study was discussed. An announcement of the initiation of the study and a request for flooding information were published in local newspapers at the outset of the study.

On September 12, 1989, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the geographic area of Granville County, North Carolina. The area of study is shown on the Vicinity Map (Figure 1).
Flooding caused by overflow of the Tar River, Tabbs Creek, Fishing Creek, Fishing Creek Tributary 1, Hachers Run, Jackson Creek, Ledge Creek, Cozart Creek, Syble Creek, Knap of Reeds Creek, Fishing Creek Tributary 1A, Coon Creek, and Jordan Creek was studied in detail.

Areas having low development potential or minimal flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for Granville County and the City of Oxford, North Carolina (References 2 and 3) and the Flood Insurance Rate Map for the City of Creedmoor, North Carolina (Reference 1) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through April 1993. The scope and methods of study were proposed to and agreed upon by FEMA and Granville County.

2.2 Community Description

Granville County is in north central North Carolina along the northern state boundary about 25 miles northeast of the City of Durham. The county is bordered by Person and Durham Counties, North Carolina on the west; Wake County, North Carolina on the south; Franklin and Vance Counties, North Carolina on the east; and Mecklenberg and Halifax Counties, Virginia on the north. Granville County is served by Interstate 85, U.S. Routes 15

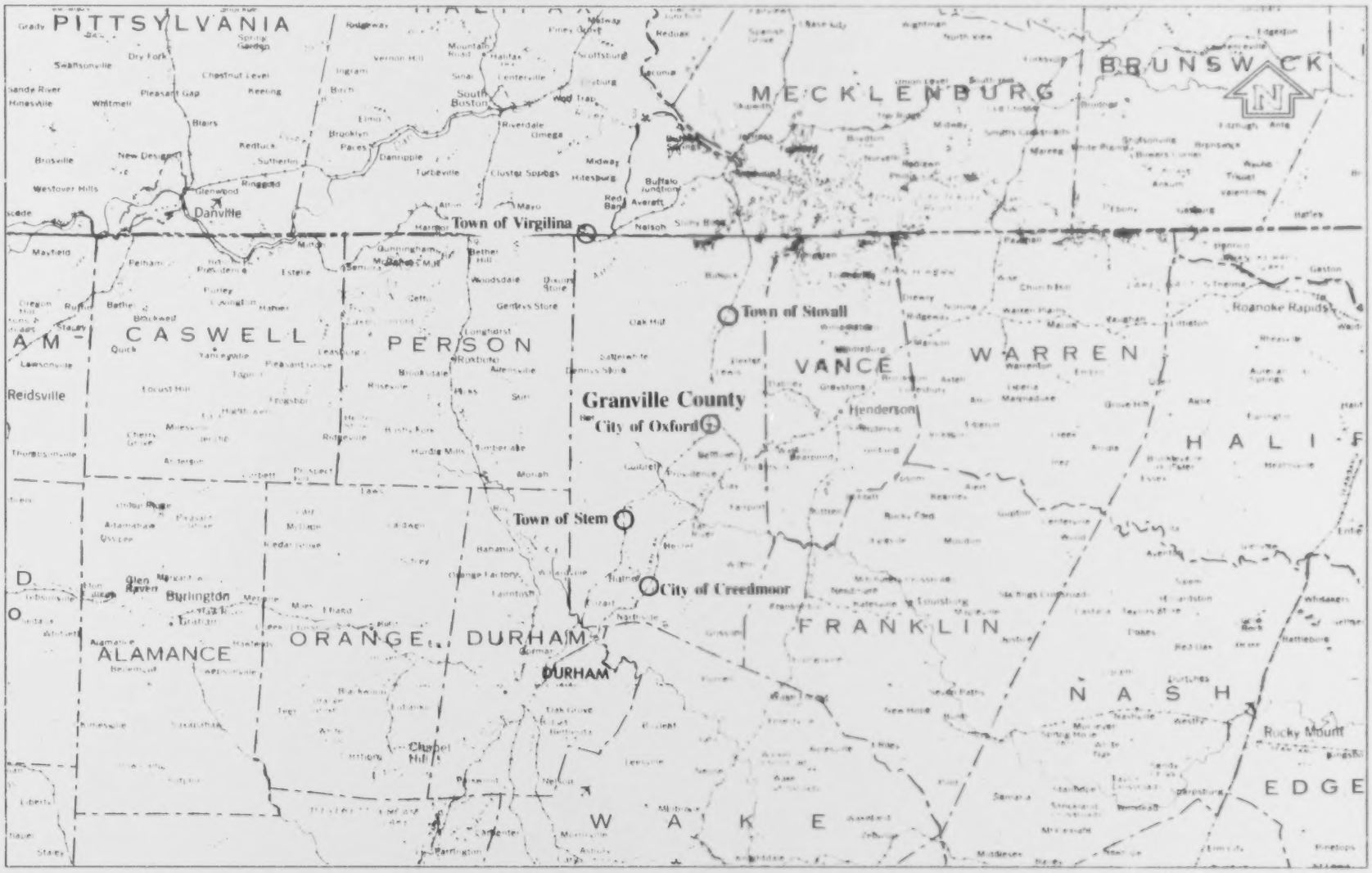


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE COUNTY, NC
AND INCORPORATED AREAS

APPROXIMATE SCALE

12 0 12 24 36 MILES

VICINITY MAP

and 158, and the Norfolk Southern Railway. The 1980 population for Granville County was reported to be 34,043 (Reference 4).

From the outset, Granville County has been known as an excellent agricultural area. Most early settlers took up farming immediately upon their arrival. By 1746, the county population was sufficient to warrant forming Granville from a portion of Edgecombe County. In 1775, the county ranked among the four most populous in the State. In spite of the growth in population, however, there were no towns in Granville County prior to 1759. The present county seat, Oxford, was established in 1812. When a group of commissioners appointed by the North Carolina General Assembly platted 50 acres of land near the existing Granville County Courthouse in 1816, a corporate government was formed, and Oxford was incorporated. Following the Civil War, tobacco farming became important and dominated the county's economy for many years. During that period, the chief manufacturing activity was processing tobacco into plugs and twists for chewing and smoking (Reference 5). Oxford was soon an economic and cultural center becoming a marketplace for the surrounding cotton and tobacco plantations. The construction of a railway to Oxford in 1881 stimulated the area's industrial development. By the 1920s, Granville County's economic base included a cotton mill, hosiery mill, rolling mill, motor corporation, wheel factory, body factory, and three tobacco warehouses (Reference 6).

Today, the economy of Granville County is based on a mixture of industry and agriculture. Farming and farm-related businesses are still of primary importance with tobacco and livestock being the two major products. At the Oxford Tobacco Research Station, research is conducted through the joint efforts of the United States and the North Carolina Departments of Agriculture. Among the industries located in the area are timber processors, and manufacturers of fabrics, yarns, clothing, steel pipe, asphalt roofing, telephone equipment, and cosmetics (Reference 7).

The topography of Granville County is typical of much of the Piedmont region; hills are moderately steep, with narrow ridges. Along the larger streams, including the Tar River, Ledge Creek, and Knap of Reeds Creek, pronounced escarpments separate uplands from stream terraces. Land elevations along the streams vary from about 250 feet to over 400 feet National Geodetic Vertical Datum of 1929 (NGVD), and uplands generally range from 350 feet to 550 feet NGVD. Principal soils are of the Cecil-Madison and Appling-Vance-Helena Associations. These are deep, sloping, well-drained soils, found on ridges and side slopes. Floodplain soils are principally of the Chewacla-Wehadkee-Congaree Association. These are deep, nearly level, poorly drained soils (Reference 8).

Granville County has a mild climate, with an average annual temperature of 60 degrees Fahrenheit and an average annual precipitation of 44 inches (Reference 9).

2.3 Principal Flood Problems

Low-lying areas of Granville County are subject to periodic flooding from the Tar River, Fishing Creek, Ledge Creek, Knap of Reeds Creek, Coon Creek, Jordan Creek, and other smaller creeks and tributaries included in this study. The most severe flooding on the Tar River is usually the result of heavy rains from tropical storms, but floods can occur with the passing of major storm fronts during any season of the year. The Tar River reaches flood stage about 30 hours after intense rainfall begins, and can remain out of banks for 2 to 3 days. On the smaller streams, flooding occurs primarily from thunderstorms and frontal systems; peak stages are reached within a few hours of maximum runoff. Areas having the most severe flood problems lie mostly within the Tar River, Coon Creek, and Jordan Creek floodplains. These floodplains are almost entirely undeveloped at the present time.

2.4 Flood Protection Measures

Flood protection measures are not known to exist within the study area. A portion of Falls Lake on the Neuse River lies in the southwest corner of Granville County. The lake is formed by a dam located near the City of Wake Forest. No meaningful protection from the 100-year flood is provided by this facility. Lake Butner is located at the upstream limit of Knap of Reeds Creek. The lake is formed by the R.D. Holt Reservoir Dam which provides no meaningful protection from the 100-year flood.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40-percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60-percent (6 in 10). The

analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

Discharges were determined using U.S. Geological Survey (USGS) equations (Reference 10). Peak discharge-drainage area relationships for the 100-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
TAR RIVER		
at SR 1622	216.00	22,800
at State Road 96	167.00	19,400
at U.S. Route 15	140.00	17,300
at SR 1133	136.00	17,000
at Norfolk Southern Railway	122.00	15,800
JACKSON CREEK		
at mouth	5.49	2,150
approximately 7,000 feet upstream of SR 1004	2.87	1,420
LEDGE CREEK		
at SR 1110	20.80	5,060
at SR 1111	17.50	4,530
at upper end of Lake Rodgers	6.79	2,460
at SR 1215	3.28	1,550
at SR 1004	1.78	1,050
SYBLE CREEK		
at SR 1724	3.06	1,480
approximately 3,000 feet downstream of SR 1110	1.90	1,090

TABLE 1 - SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
HACHERS RUN		
at mouth	5.54	2,160
at Interstate 85	4.50	1,890
at SR 1164	1.47	920
TABBS CREEK		
at SR 1609	16.06	4,290
at SR 1611	9.69	3,100
about 5,400 feet downstream of Interstate 85	7.06	2,530
at Interstate 85	4.56	1,910
FISHING CREEK		
at mouth	46.50	8,940
just upstream of confluence of Coon Creek	16.76	4,410
just upstream of confluence of Hachers Run	10.79	3,320
just upstream of confluence of Fishing Creek Tributary	5.48	2,150
KNAP OF REEDS CREEK		
approximately 7,000 feet downstream of SR 1120	41.30	7,870
approximately 2,000 feet downstream of SR 1120	39.80	7,680
at SR 1121	29.90	6,390
at Lake Butner	29.37	6,320
COZART CREEK		
approximately 2.5 miles downstream of SR 1103	3.28	1,540
approximately 2,000 feet downstream of SR 1103	1.18	800

TABLE 1 - SUMMARY OF DISCHARGES (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
JORDAN CREEK		
at mouth	9.64	3,090
at SR 1522	9.04	2,960
at U.S. Route 15	6.36	2,360
COON CREEK		
at SR 1606	22.65	5,350
just downstream of confluence of Jordan Creek	20.00	4,940
FISHING CREEK TRIBUTARY 1		
at mouth	4.91	2,000
approximately 700 feet upstream of U.S. Route 85	3.43	1,600
just downstream of confluence of Fishing Creek Tributary 1A	2.95	1,440
just upstream of confluence of Fishing Creek Tributary 1A	1.90	1,090
at U.S. Route 15	1.49	920
FISHING CREEK TRIBUTARY 1A		
at mouth	1.05	740
at U.S. Route 15	0.42	420

Elevations for floods of the selected intervals of Falls Lake and Lake Butner are shown in Table 2.

TABLE 2 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	PEAK ELEVATION (FEET NGVD) 100-YEAR
FALLS LAKE	
along shoreline	262.5

TABLE 2 - SUMMARY OF ELEVATIONS (Continued)

FLOODING SOURCE AND LOCATION	PEAK ELEVATION (FEET NGVD) 100-YEAR
LAKE BUTNER from just upstream of R.D. Holt Reservoir Dam to just downstream of Roberts Chapel Road	360.4

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Elevation data and structural geometry on bridges, culverts, and dams were obtained from field surveys, as were adjacent floodplain cross sections. Additional cross section information was taken from topographic maps (Reference 11).

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Roughness coefficients (Manning's "n") were estimated during a field inspection. Coefficients used in this study range from 0.04 to 0.07 in the channels and from 0.07 to 0.18 in the overbank areas.

Water-surface elevations of the 100-year floods were computed using the HEC-2 step-backwater computer program (Reference 12). Starting water-surface elevations for the streams were determined using the slope-area method.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the NGVD. Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 enlarged to 1:12000 with a contour interval of 10 feet (Reference 11).

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using the Flood Hazard Boundary Maps for Granville County and the City of Oxford, North Carolina (References 2 and 3), and the Flood Insurance Rate Map for the City of Creedmoor (Reference 1).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood

heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways for this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 3, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than 1.0-foot increase in the base flood elevations at any point within the community.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

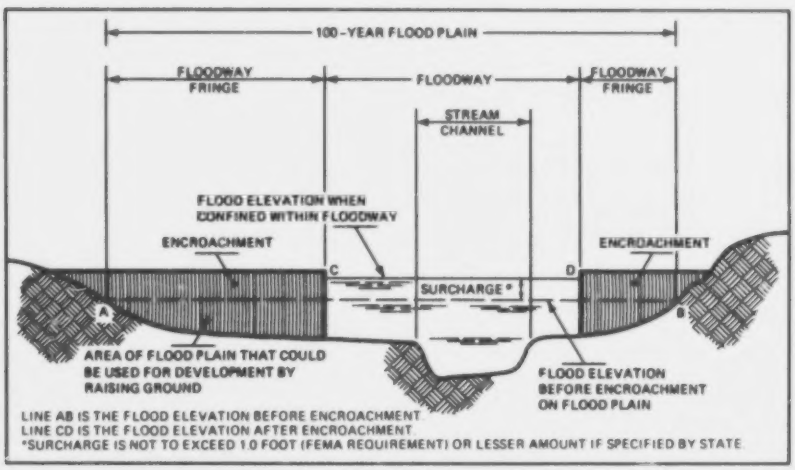

100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE *
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
COON CREEK								
A	17,400	340	2502	2.1	364.2	364.2	365.0	0.8
B	17,875	340	2695	2.0	365.7	365.7	366.3	0.6
C	19,300	209	2118	2.5	368.0	368.0	368.5	0.5
D	20,700	330	3199	1.7	369.7	369.7	370.3	0.6
E	23,400	245	2011	2.7	372.3	372.3	373.2	0.9
F	24,065	145	1688	3.2	375.4	375.4	376.1	0.7
G	26,600	330	3637	1.5	381.0	381.0	381.7	0.7
H	27,860	300	3448	1.4	382.1	382.1	383.0	0.9
I	28,500	320	3322	1.5	382.9	382.9	383.7	0.8
JORDAN CREEK								
A	800[2]	350	1923	1.6	383.5	380.4[3]	381.2	0.8
B	2500[2]	130	872	3.5	386.5	386.5	386.9	0.4
C	4880[2]	71	545	5.7	394.1	394.1	394.6	0.5
D	5700[2]	100	1028	2.9	397.9	397.9	398.2	0.3
E	6900[2]	250	2823	1.0	399.6	399.6	400.5	0.9
F	10,000[2]	110	946	3.1	405.0	405.0	405.8	0.8
G	11,200[2]	90	519	5.7	416.8	416.8	417.4	0.6
H	12,370[2]	120	658	4.5	426.5	426.5	427.3	0.8
I	12,940[2]	100	873	2.7	431.2	431.2	431.4	0.2
J	14,000[2]	150	987	2.4	432.9	432.9	433.6	0.7
K	15,400[2]	80	944	2.5	448.7	448.7	449.3	0.6

[1]FEET ABOVE MOUTH
[2]FEET ABOVE CONFLUENCE WITH COON CREEK
[3]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM COON CREEK

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE COUNTY, NC AND INCORPORATED AREAS

FLOODWAY DATA

COON CREEK–JORDAN CREEK

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The current Flood Insurance Rate Map presents flooding information for the geographic area of Granville County. Previously, separate Flood Hazard Boundary Maps and/or Flood Insurance Rate Maps were prepared for each flood-prone incorporated community and the unincorporated areas of

the county. Historical data relating to the maps prepared for each community are presented in Table 4, Community Map History.

7.0 OTHER STUDIES

The COE published a study of the flood conditions along the Tar River in Franklin, Vance, and Granville Counties, North Carolina (Reference 13). The Granville County study contains more recent determinations and does not match the COE report.

The Flood Insurance Study published for Durham County (Reference 14) is in agreement with this study.

The Flood Insurance Study in progress for Person County (Reference 15) is in agreement with this study.

The revision in progress to the published Flood Insurance Study for Wake County (Reference 16) is in agreement with this study.

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Maps for Granville County, North Carolina and the City of Oxford, North Carolina (References 2 and 3) and the previously printed Flood Insurance Rate Map for the City of Creedmoor, North Carolina (Reference 1).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Rate Map, City of Creedmoor, Granville County, North Carolina, June 1976.

2. ----------, Federal Insurance Administration, Flood Hazard Boundary Map, Granville County, Unincorporated Areas, North Carolina, April 1978.

3. ----------, Federal Insurance Administration, Flood Hazard Boundary Map, City of Oxford, Granville County, North Carolina, January 1978.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
CREEDMOOR, CITY OF	JUNE 28, 1974	APRIL 2, 1976	JUNE 25, 1976	
OXFORD, CITY OF	JAN 13, 1978		SEPTEMBER 28, 1990	
STEM, TOWN OF	SEPTEMBER 12, 1989		SEPTEMBER 28, 1990	
UNINCORPORATED AREAS	APRIL 21, 1978		SEPTEMBER 28, 1990	

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE CO., NC
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

4. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, North Carolina, Washington, D.C., February 1982.

5. Bill Sharpe, A New Geography of North Carolina, Sharpe Publishing Company, Raleigh, North Carolina.

6. Region K Council of Governments, Oxford Land Use Element, 1978.

7. Area Lifestyle Publications, Oxford/Granville County Guide, Winston-Salem, North Carolina, 1984.

8. U.S. Department of Agriculture, Soil Conservation Service, Preliminary Draft of General Soil Map, Granville County, North Carolina, not published.

9. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Services, Climatological Data for North Carolina, Asheville, North Carolina, 1985.

10. U.S. Department of the Interior, Geological Survey, Magnitude and Frequency of Floods in Rural and Urban Basins of North Carolina, 1987.

11. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 10 Feet: Berea, North Carolina (1981); Creedmoor, North Carolina (1974, photorevised 1981); Lake Michie, North Carolina (1977); Northeast Durham, North Carolina (1973, photorevised 1981); Oxford, North Carolina (1981); Stem, North Carolina (1974); and Wilton, North Carolina (1977).

12. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, April 1984.

13. ----------, Wilmington District, Flood Plain Information, Tar River, Franklin, Vance, and Granville Counties, North Carolina, 1974.

14. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Durham County, Unincorporated Areas, North Carolina, August 1978.

15. Federal Emergency Management Agency, Flood Insurance Study, Person County, Unincorporated Areas, North Carolina, in progress.

16. ----------, Flood Insurance Study, Wake County, Unincorporated Areas, North Carolina, February 1985, revision in process.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0100	378.26	North Carolina Geological Survey monument stamped "GRA 19 1977" set on centerline of median of Interstate 85, about 3.70 feet southwest of center of metal drainage cover over Coon Creek
2	0100	372.64	chiseled square on top of east end of box culvert for Coon Creek under Interstate 85
3	0100	387.95	U.S. Geological Survey monument stamped "M 201 1978" (steel rod with cap about 7 inches deep inside a pipe) located on south side of U.S. Route 158 about 270 feet east of south headwall of box culvert for Coon Creek
4	0100	378.85	chiseled square on southeast corner of box culvert for Coon Creek under U.S. Route 158
5	0100	395.12	chiseled square on northeast corner of box culvert for Jordan Creek on downstream side of Salem Road
6	0100	437.79	N.C. Department of Transportation disk stamped "STA 1-CCM-5 1982" set in post flush with ground located 33.50 feet east of centerline of College Road, about 38.50 feet west of northbound Norfolk Southern Railway track, 47.50 feet south of centerline of Westbury Drive

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
7	0100	397.17	chiseled square in concrete headwall on northeast end of Norfolk Southern Railway trestle over Jordan Creek, upstream from Salem Road
8	0100	431.76	chiseled square in concrete headwall in northeast corner of Norfolk Southern Railway trestle over Jordan Creek just east of College Road
9	0100	428.09	chiseled square at northeast corner of box culvert for Jordan Creek under College Road
10	0100	434.79	chiseled square on top of northeast corner of box culvert for Fishing Creek Tributary 1 under Lewis Street
11	0100	434.37	chiseled square on top of northeast corner of headwall for twin 60-inch pipe culvert for Fishing Creek Tributary 1A under Lewis Street
12	0100	432.44	chiseled square on top of northeast corner of box culvert for Tributary B under Lewis Street
13	0100	456.99	chiseled square on top of downstream end of 30-inch pipe culvert for Hachers Run under Lake Devin Road
14	0100	492.21	top of 0.75-inch iron pipe flush with ground on Lake Devin Dam, 300 feet northeast of northeast end of box culvert under Lake Devin Road

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
15	0100	491.50	chiseled square in left downstream corner of box culvert for Hachers Run under Lake Devin Road at end of Lake Devin spillway
16	0100	502.28	North Carolina Geological Survey monument stamped "FOREST, 1971" located 116.5 feet north of southbound Interstate 85, about 1,600 feet east of Tom Parham Road
17	0100	423.73	20d nail and Corps of Engineers cap in top of wheelguard on southeast corner of Tom Parham Road bridge over Tabbs Creek
18	0100	441.43	North Carolina Geological Survey monument stamped "DOGWOOD, 1971" located 99.9 feet north of southbound Interstate 85, about 250 feet east of Tabbs Creek
19	0100	404.40	chiseled square on top left corner, of south headwall of box culvert for Tabbs Creek under Interstate 85
20	0100	401.52	North Carolina Geological Survey disk stamped "D 201-1978" set in northwest corner of abutment on U.S. Route 158 bridge over Tabbs Creek
21	0100	401.99	chiseled square on left downstream wingwall of U.S. Route 158 bridge over Tabbs Creek

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
22	0125	463.19	North Carolina Geological Survey disk stamped "Clayton 1971" set in concrete monument located at intersection of Old Route 75 and Brogden Road, 14.7 feet northeast of centerline of Brogden Road, 98.3 feet southeast of centerline for Old Route 75
23	0125	423.34	chiseled square on northeast corner of box culvert for Jackson Creek under Old Route 75
24	0125	405.29	20d nail and Corps of Engineers cap in top of wooden headwall at southeast end of abandoned railroad trestle over Jackson Creek
25	0125	385.95	chiseled square on top of wingwall at southeast corner of Old Route 75 bridge over the Tar River
26	0125	400.81	chiseled square in top concrete headwall at northeast corner of abandoned railroad trestle over the Tar River
27	0125	369.27	chiseled square on wingwall at northeast end of Belltown Road bridge over the Tar River
28	0125	366.67	chiseled square on headwall at northeast end of southbound Interstate 85 bridge over the Tar River

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
29	0125	365.90	chiseled square on headwall on northeast corner of northbound Interstate 85 bridge over the Tar River
30	0125	324.16	North Carolina Geological Survey disk stamped "GRA 20, 1977" set in concrete wingwall at northeast corner of U.S. Route 15 bridge over the Tar River
31	0125	501.66	North Carolina Geological Survey monument stamped "SIM 1971" located at intersection of Old Route 75 and Culbreth Road, 45.9 feet northeast of centerline of Culbreth Road, 27 feet east of centerline of Old Route 75
32	0125	505.04	20d nail and Corps of Engineers cap 2 feet above ground in power pole located on Old Route 75, about 1.15 miles east of Culbreth Road, across road from Daniels residence
33	0125	402.01	chiseled square at southeast corner of box culvert for Ledge Creek under Old Route 75
34	0125	399.66	20d nail and Corps of Engineers cap on top of wood headwall at northeast end of abandoned railroad trestle over Ledge Creek

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
35	0125	328.69	North Carolina Geological Survey monument stamped "GRA 27 1977" located 16.7 feet northeast of centerline of intersection of Brogden Road and Lyon Station Road, about 34 feet northwest of pine tree
36	0125	314.47	20d nail and Corps of Engineers cap in top of wood headwall support post at east end of Lyon Station Road bridge over Ledge Creek
37	0125	307.58	chiseled square on top northeast corner of box culvert for Ledge Creek under Interstate 85
38	0125	368.93	chiseled square on top concrete wall on top northeast end of R.D. Holt Reservoir Dam, at west side of spillway
39	0150	438.41	20d nail and Corps of Engineers cap in top of wooden post in headwall on northeast end of Old Route 75 bridge over Hachers Run
40	0150	442.60	chiseled square on southeast end of abandoned railroad wooden trestle over Hachers Run
41	0150	409.17	chiseled square on top of northeast end of box culvert for Hachers Run under U.S. Route 15
42	0150	405.09	chiseled square on top northeast end of box culvert for Hachers Run under Knotts Grove Road

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
43	0150	427.86	North Carolina Geological Survey monument stamped "Belltown 1971" located 39.5 feet northwest of southbound Interstate 85 at Hachers Run
44	0150	445.41	North Carolina Geological Survey monument stamped "PROJECT 1971" located 2.2 feet northwest of wingwall at southwest corner of State Road 96 bridge over Interstate 85
45	0150	365.22	chiseled square on left downstream wingwall at southeast end of Orphanage Road bridge over Coon Creek
46	0150	404.22	chiseled square at southeast end of box culvert for Fishing Creek Tributary 1 under Interstate 85
47	0150	402.99	chiseled square on southeast end of box culvert for Fishing Creek Tributary 1 under SR 1649
48	0150	459.25	North Carolina State Highway Commission monument stamped "26 JS 13 1962" located in south corner of intersection of State Road 96 and Fairport Road, 14.9 feet southwest of power pole
49	0150	447.57	20d nail and Corps of Engineers cap in power pole located in southeast corner of intersection of Knotts Grove Road and Fielding Knott Road

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
50	0150	374.58	20d nail and Corps of Engineers cap on top of wood post of wingwall at southeast end of Knotts Grove Road bridge over Fishing Creek
51	0150	359.75	chiseled square on top of concrete wheelguard at northeast corner of Fielding Knott Road bridge over Fishing Creek
52	0150	356.70	chiseled square on left downstream corner of box culvert for Fishing Creek under State Road 96
53	0150	324.69	disk stamped "180 DRD, 1960, 325" located in south end of west concrete wheelguard of State Road 96 bridge over the Tar River
54	0150	326.63	chiseled square in concrete wingwall at northeast corner of State Road 96 bridge over the Tar River
55	0150	443.72	20d nail and Corps of Engineers cap in power pole No. 4A-167 located in northwest corner of tee intersection of State Road 96 and Tom Hunt Road
56	0150	395.82	20d nail and Corps of Engineers cap in transformer pole No. 39-56-09 located on east side of Cannadys Mill Road about 1.0 mile northeast of State Road 96
57	0150	312.63	chiseled square on headwall at northeast corner of Cannadys Mill Road bridge over the Tar River

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
58	0150	427.90	20d nail and Corps of Engineers cap in transformer pole No. 2336 located on east side of State Road 96 about 1.10 miles north of the Tar River
59	0150	345.51	chiseled square on wingwall at southeast end of Eaton Road bridge over Fishing Creek
60	0150	467.73	North Carolina Geological Survey monument stamped "26 JS 16 1962" located on east side of Dorsey Road about 1.40 miles south of U.S. Route 158, about 150 feet southwest of northwest corner of well, 16.7 feet east of edge of pavement, 75.38 feet northwest of southwest corner of frame house
61	0150	340.45	chiseled square on wingwall at northeast corner of Dorsey Road bridge over Tabbs Creek
62	0150	313.20	20d nail and Corps of Engineers cap on top of wooden wheel guard on southeast corner of Ed Harris Road bridge over Tabbs Creek
63	0175	284.23	20d nail and Corps of Engineers cap on top wood headwall support post at southeast corner of State Road 56 bridge over Ledge Creek
64	0175	284.22	0.75-inch iron pipe flush with ground on top of Lake Rogers Dam, 64.5 feet east of edge of concrete spillway

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
65	0175	306.21	North Carolina Geological Survey disk stamped "GRA 42 1978" set in concrete step at entrance to Creedmoor Food Store located on U.S. Route 15, about 66.8 feet northeast of power pole
66	0175	273.27	20d nail and Corps of Engineers cap on top of wood headwall support post at southeast corner of Joe Peed Road bridge over Ledge Creek
67	0175	278.63	North Carolina Geological Survey disk stamped "GRA 41 1978" set in west end of north wheelguard on U.S. Route 15 bridge over Ledge Creek
68	0175	286.79	North Carolina Geological Survey disk stamped "GRA 40 1978" set in top of northwest corner of box culvert for Syble Creek under U.S. Route 15
69	0175	286.66	chiseled square in top southeast corner of box culvert for Syble Creek under U.S. Route 15
70	0175	356.69	North Carolina Geological Survey monument stamped "Northside 1971" located 30.2 feet northwest of U.S. Route 15, about 40.9 feet northeast of power pole No. 40, at tee intersection with Munn's Road, 35.3 feet southwest of 8-inch gum tree

ELEVATION REFERENCE MARKS (Continued)

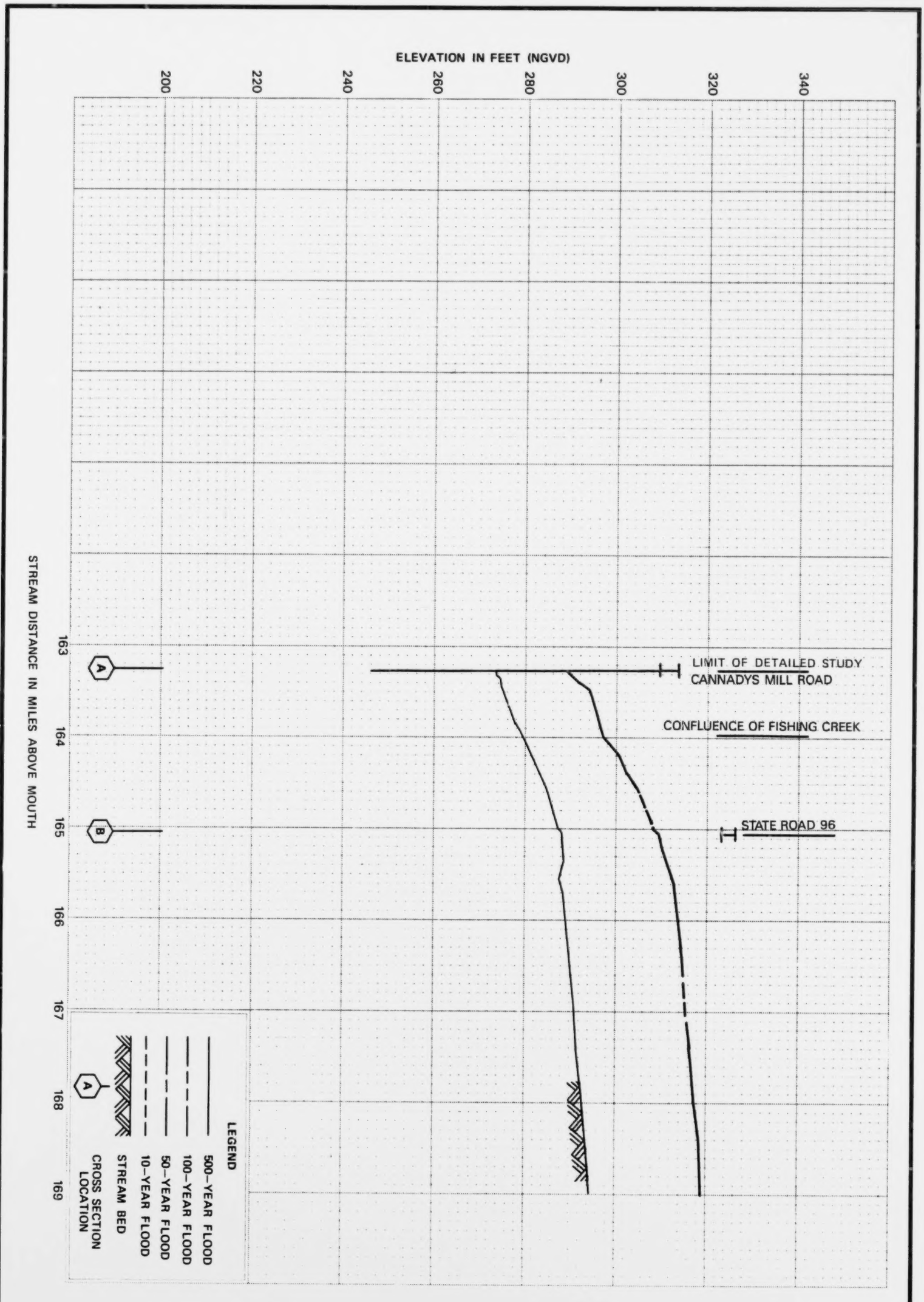
REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
71	0175	282.00	chiseled square on top downstream end of 48-inch pipe used for marsh drainage under Cash Road located 0.55 mile east of U.S. Route 15, about 0.30 mile west of Northside Road
72	0175	273.57	orange painted square on top of downstream end of 78-inch corrugated metal pipe for Syble Creek under Cash Road
73	0175	271.01	orange painted square on top of downstream end of 78-inch corrugated metal pipe culvert for Syble Creek under Northside Road
74	0175	295.23	North Carolina Geological Survey monument stamped "Butner 1971" located 6 feet southeast of southwest corner of U.S. Route 15 bridge over Interstate 85, about 3 feet from southwest end of wingwall, 63.4 feet north of end of concrete drain
75	0175	256.23	chiseled square on top southeast corner of box culvert for Cozart Creek under U.S. Route 15
76	0175	257.36	chiseled square on upstream end of box culvert under southbound Interstate 85 off-ramp at U.S. Route 15 interchange
77	0175	373.21	North Carolina Geological Survey disk stamped "GRA 35 1977" set in concrete flag pole base located in front of National Guard Armory on Butner Central Avenue

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
78	0175	347.56	chiseled square in southwest corner of box culvert for Cozart Creek under Butner Central Avenue
79	0175	402.89	North Carolina Geological Survey disk stamped "GRA 34 1977" set in concrete step on right, at large concrete water tank located in northeast corner of intersection of Butner Central Avenue and SR 1174
80	0175	274.25	20d nail and Corps of Engineers cap in top of wood pole headwall support at southwest end of SR 1120 bridge over Knap of Reeds Creek
81	0175	328.52	North Carolina Geological Survey disk stamped "GRA 32 1977" set in top east end of box culvert headwall under Old Route 75 at southwest corner of intersection of Butner 33rd Street and Old Route 75 intersection
82	0175	286.14	chiseled square on top headwall at southeast corner of Old Route 75 bridge over Knap of Reeds Creek
83	0175	289.35	20d nail and Corps of Engineers cap on top of wood headwall support at southeast corner of Range Road bridge over Knap of Reeds Creek

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
84	0075	514.04	20d nail and Corps of Engineers cap 2 feet above ground in transformer pole located on east side of Lake Devin Road, about 250 feet south of intersection of Lake Devin Road and Enon Road
85	0075	557.52	North Carolina Geological Survey disk stamped "GRA-15 1977" set in north concrete base of metal light pole located at northwest corner of intersection of U.S. Route 158 and SR 1300



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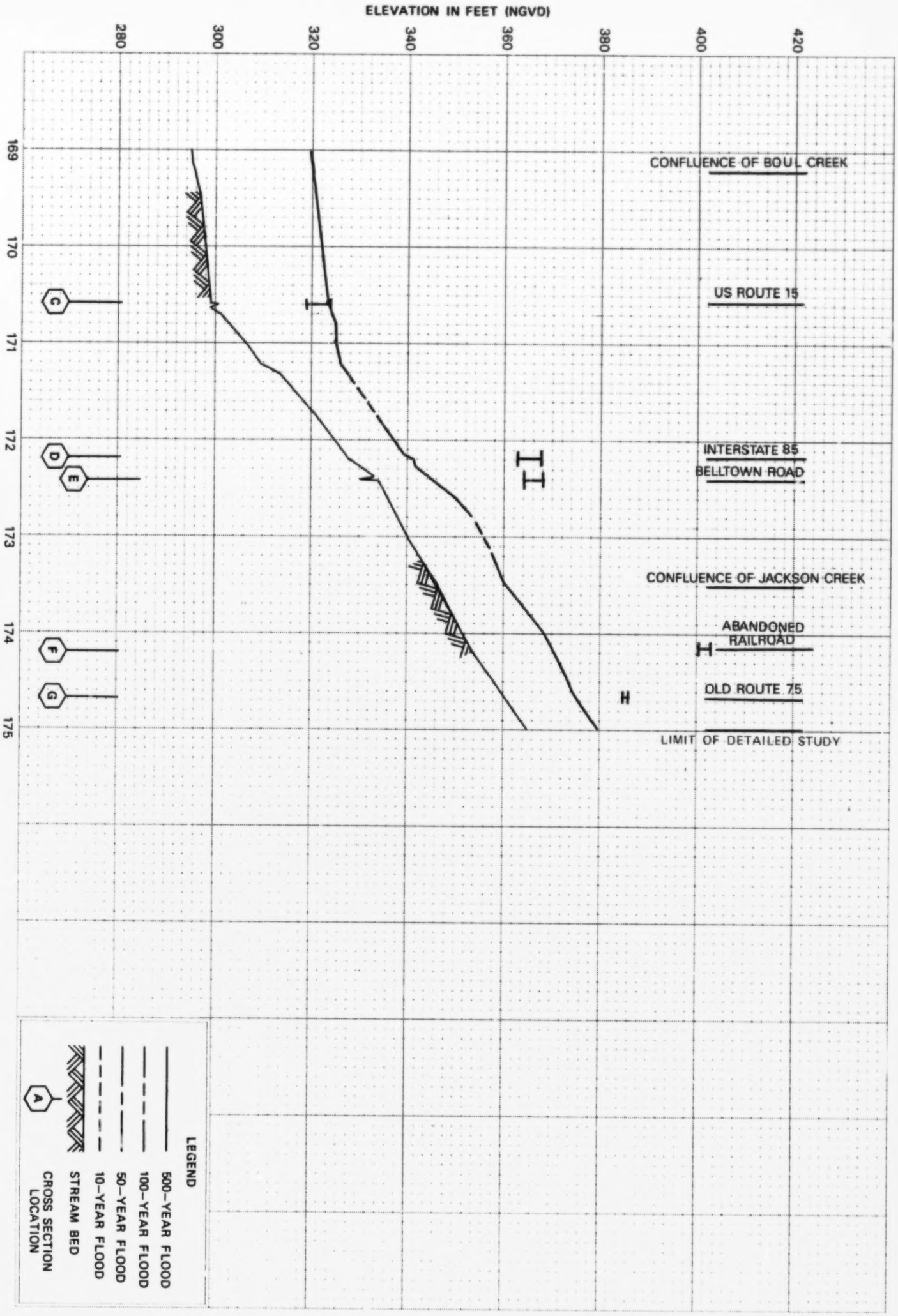
01P	FEDERAL EMERGENCY MANAGEMENT AGENCY **GRANVILLE COUNTY, NC AND INCORPORATED AREAS**	**FLOOD PROFILES** **TAR RIVER**



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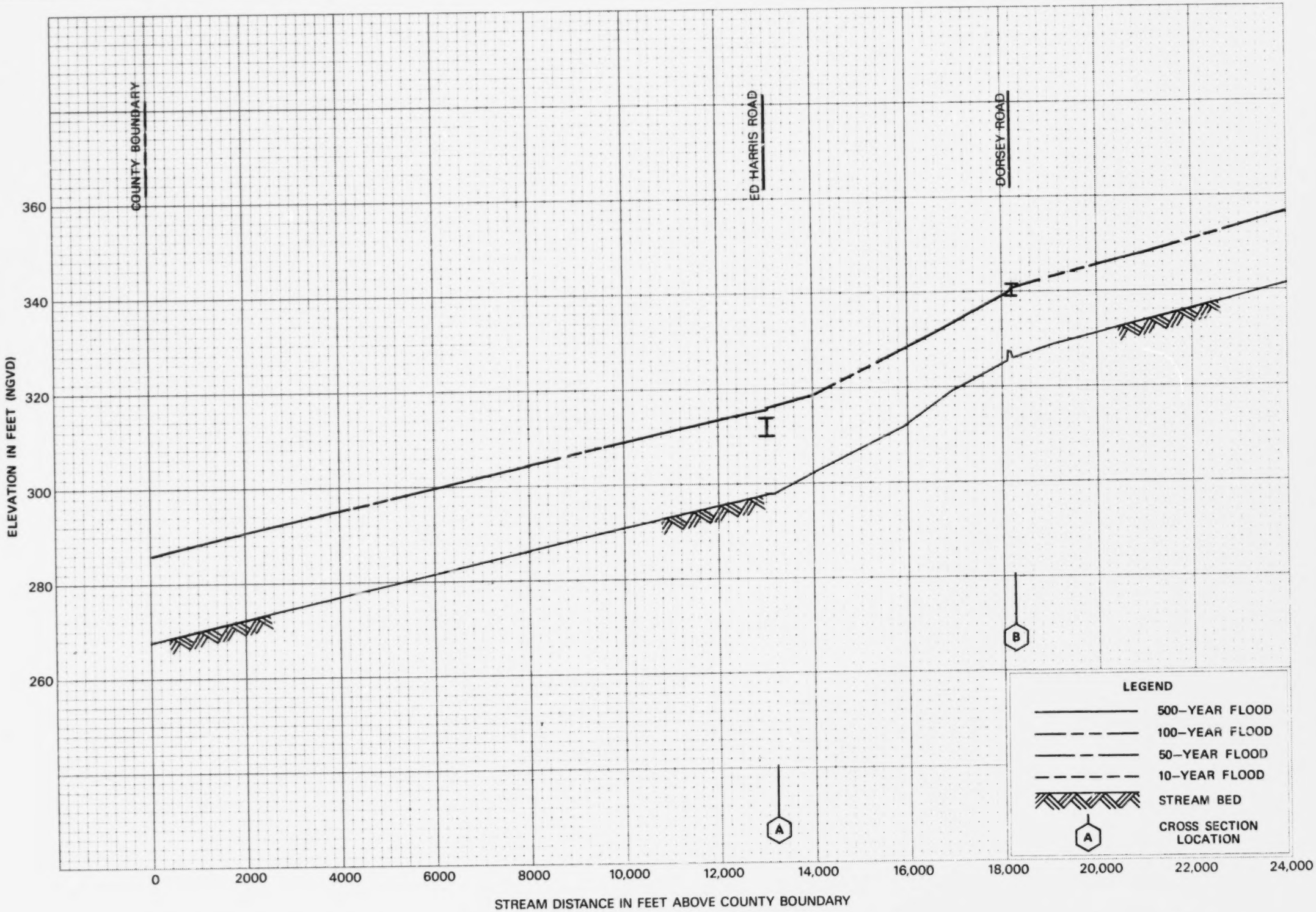


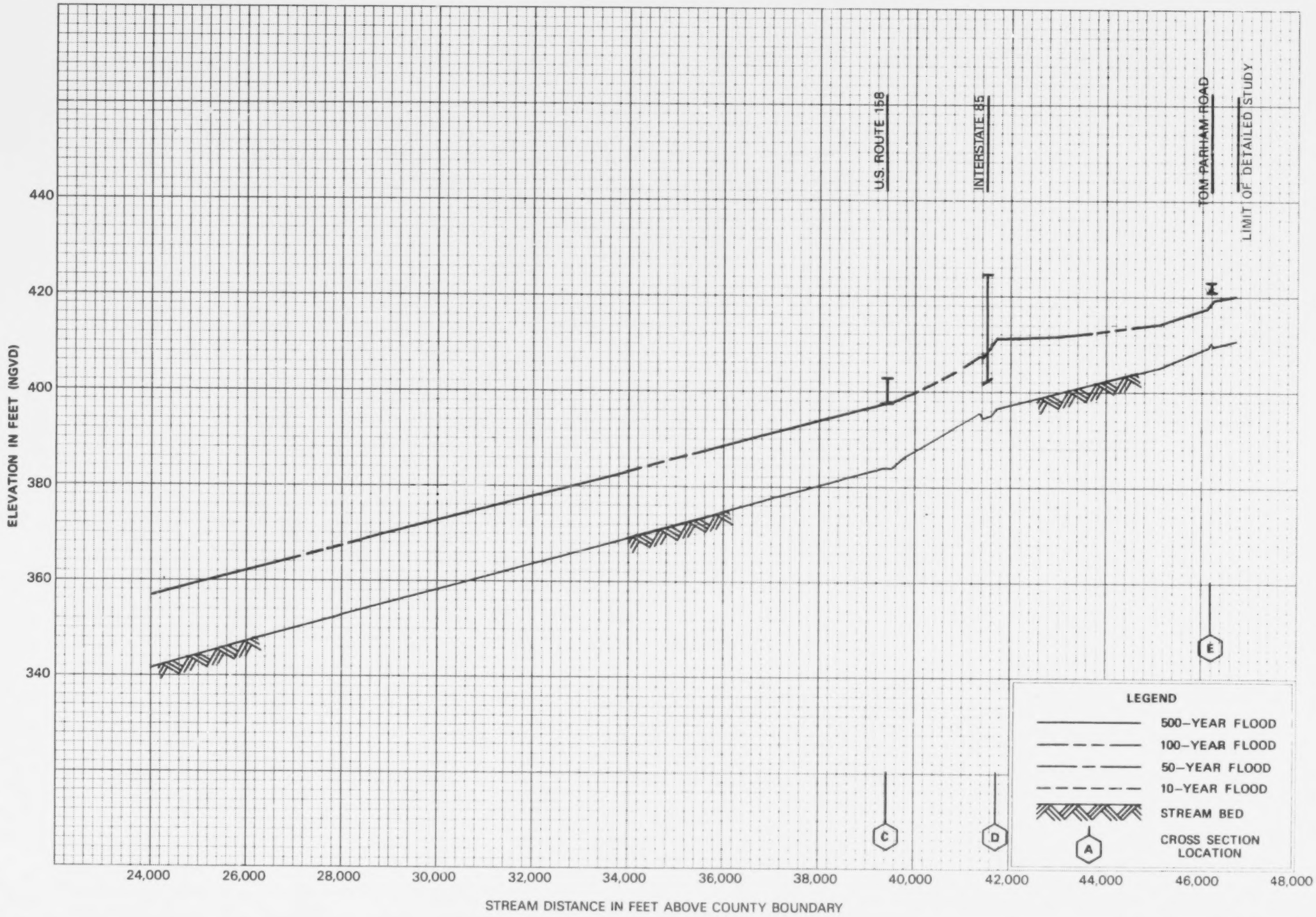
FLOOD PROFILES

TABBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE COUNTY, NC AND INCORPORATED AREAS

03P



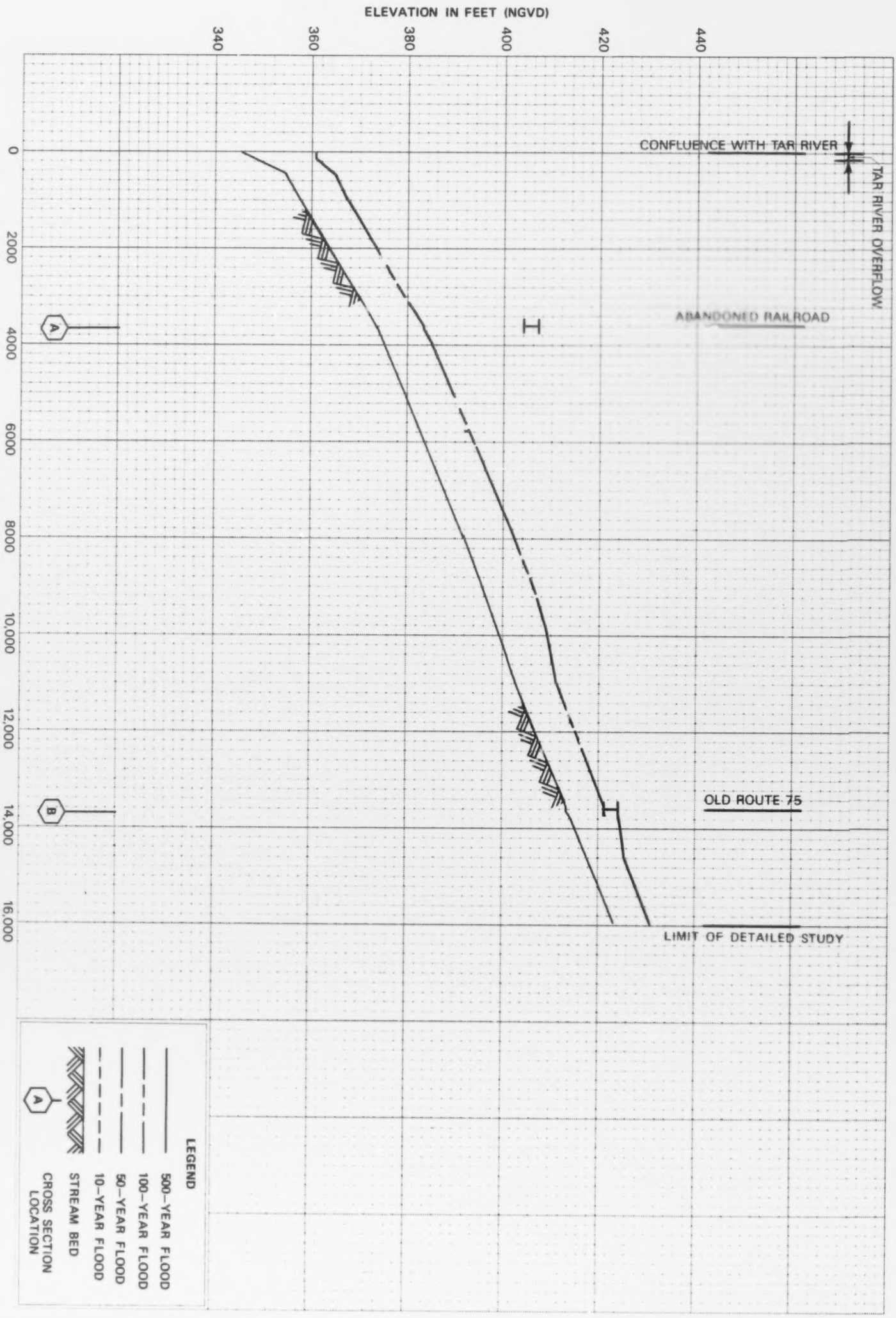
FLOOD PROFILES

TABBS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE COUNTY, NC AND INCORPORATED AREAS

04P



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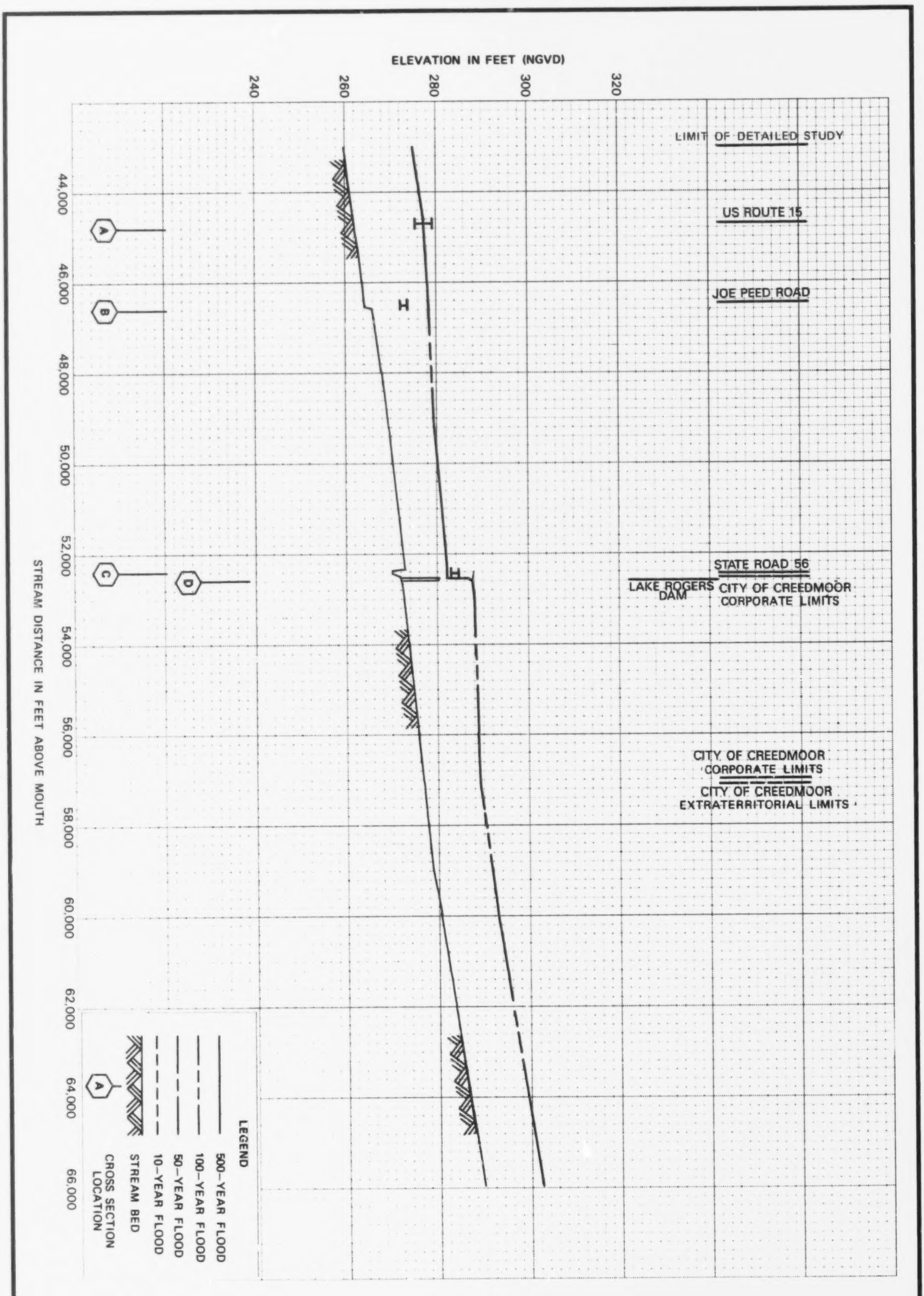
05P

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE COUNTY, NC AND INCORPORATED AREAS

FLOOD PROFILES

JACKSON CREEK



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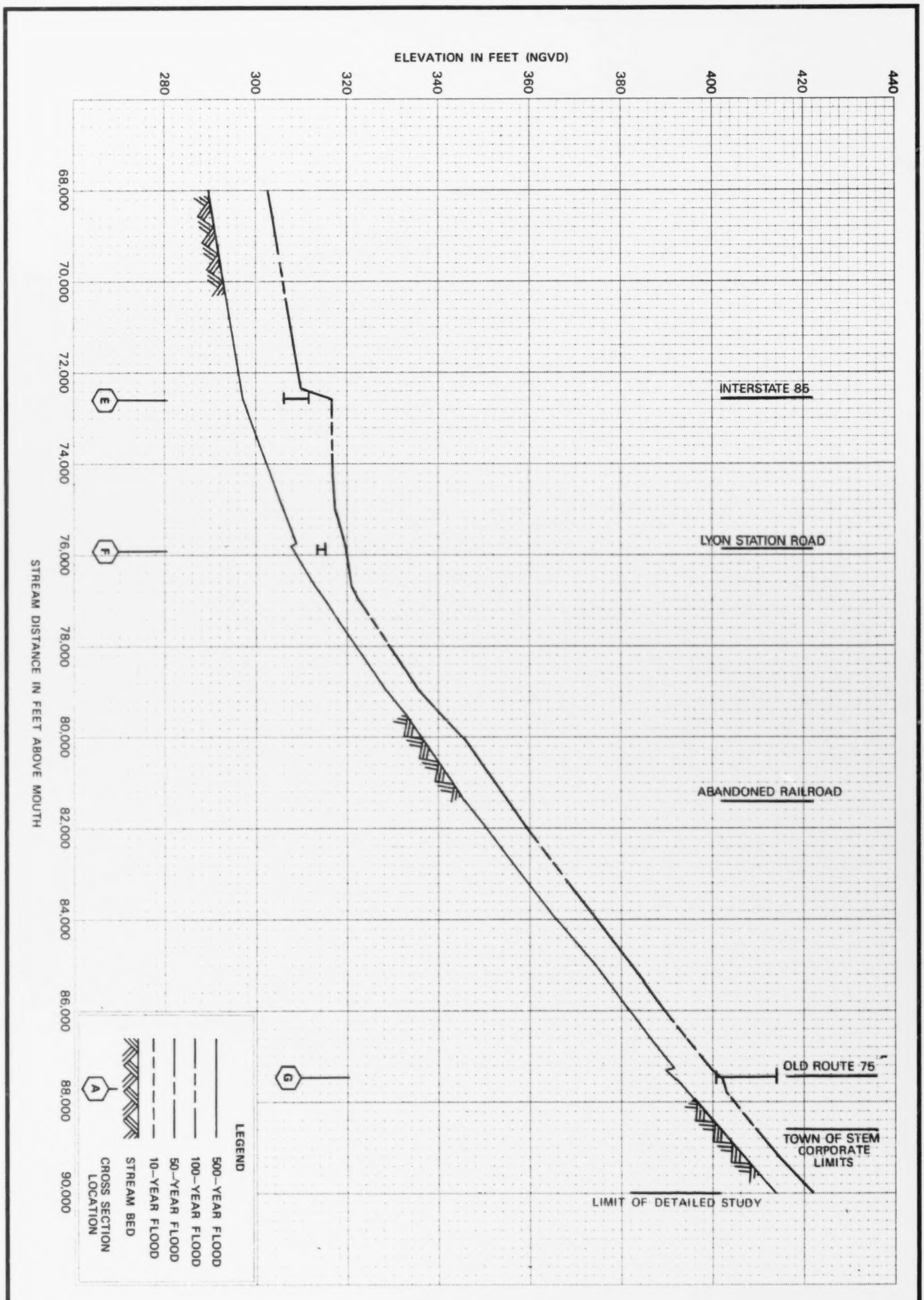

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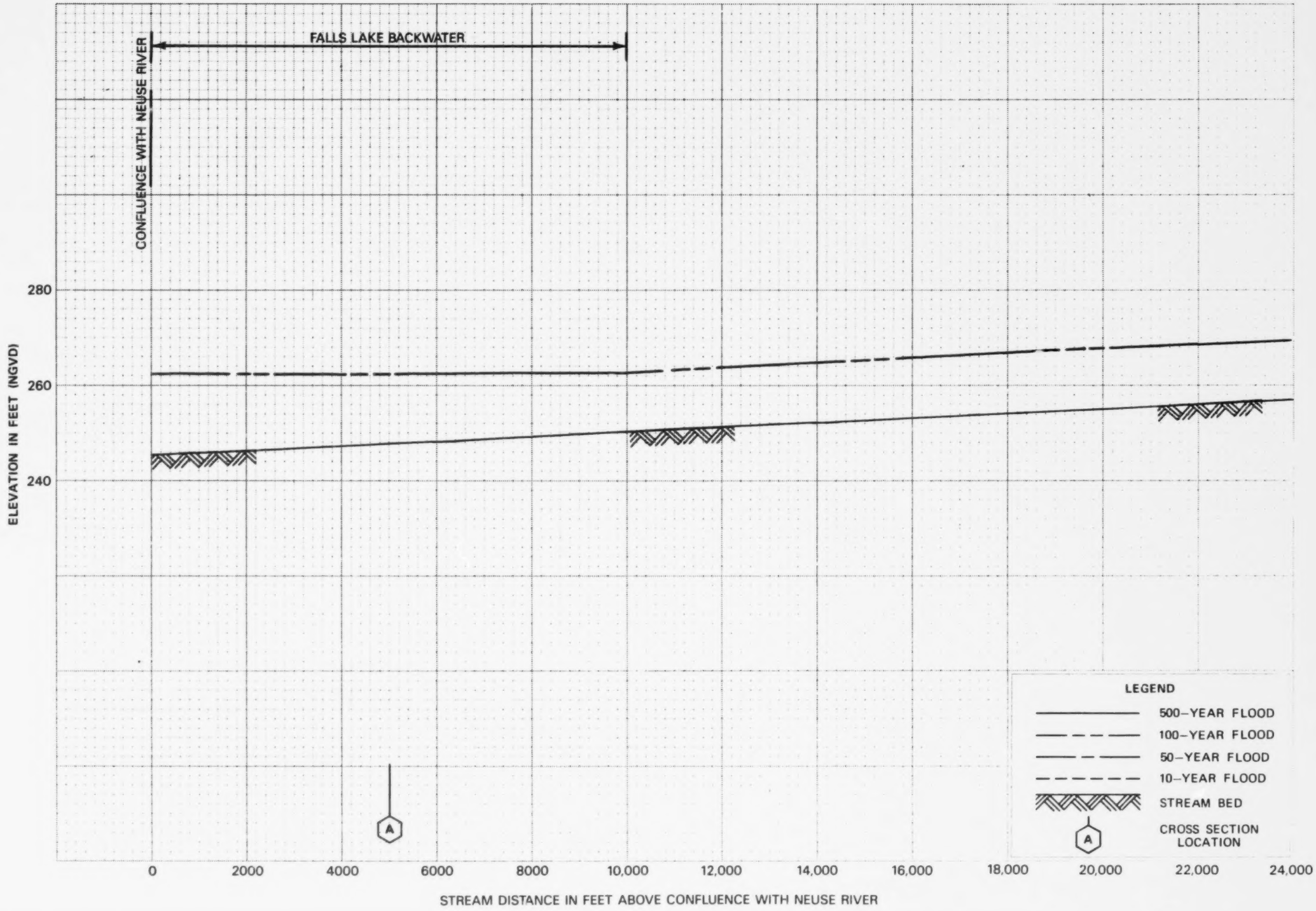


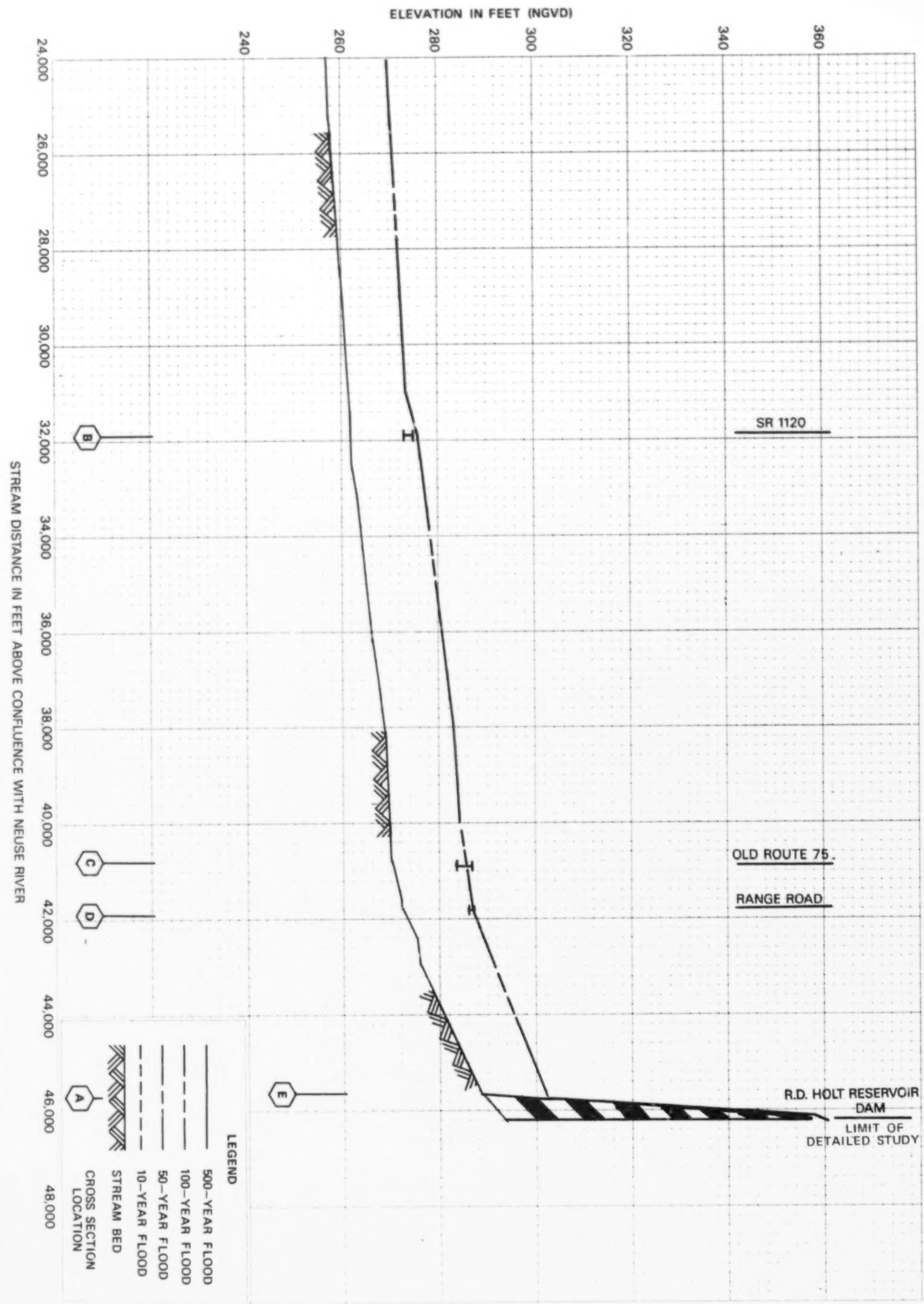
FLOOD PROFILES

KNAP OF REEDS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE COUNTY, NC
AND INCORPORATED AREAS

08P



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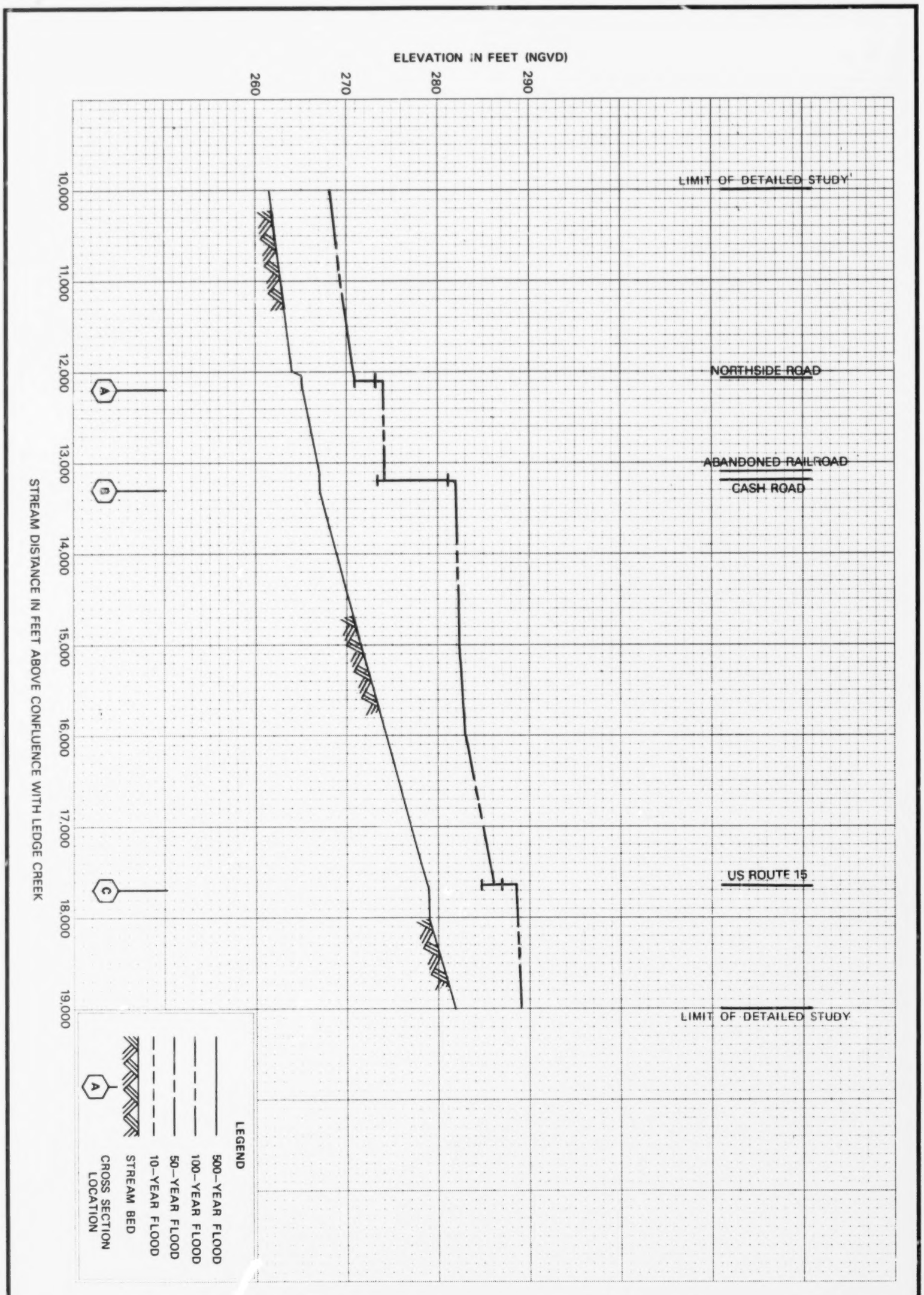

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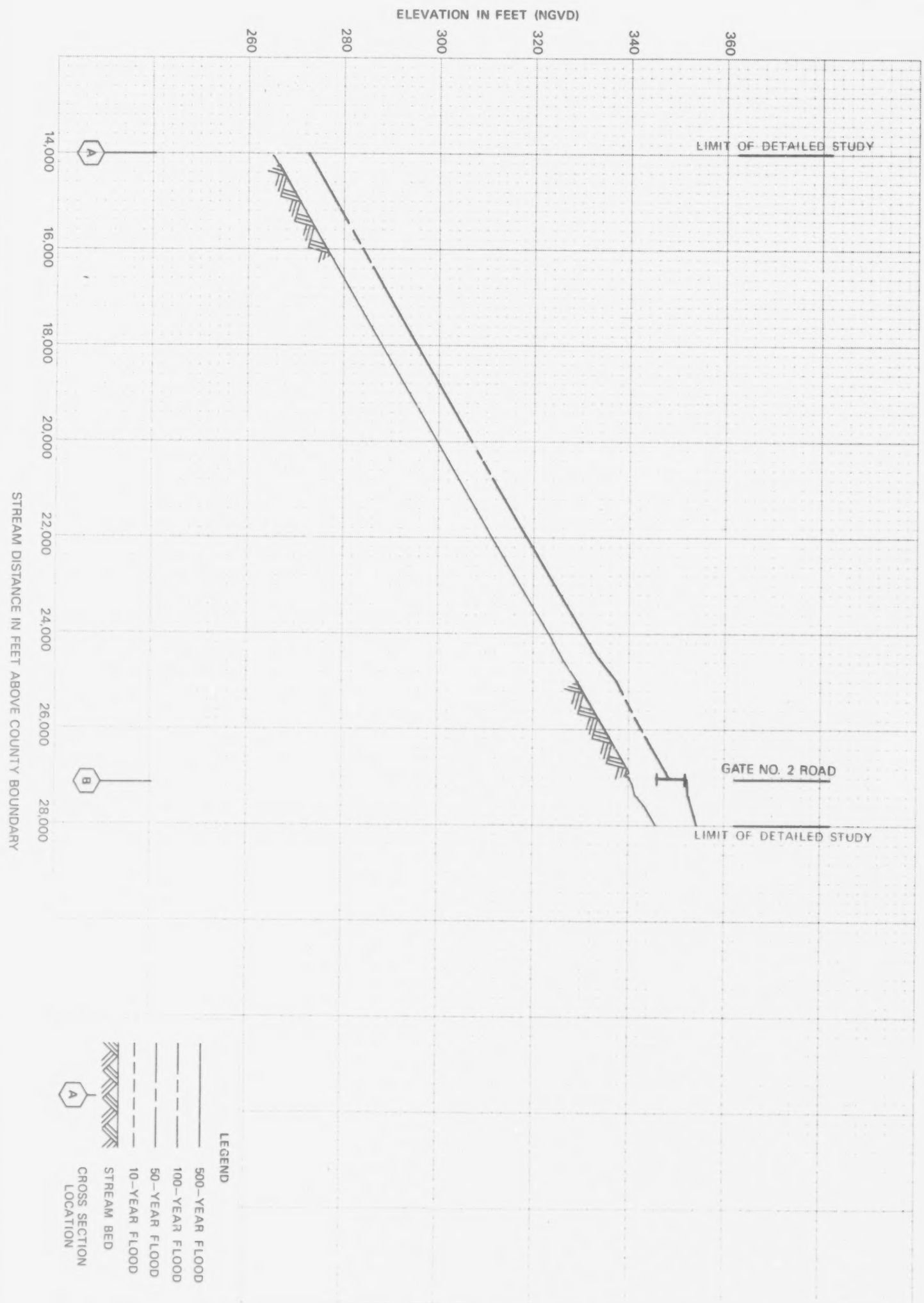

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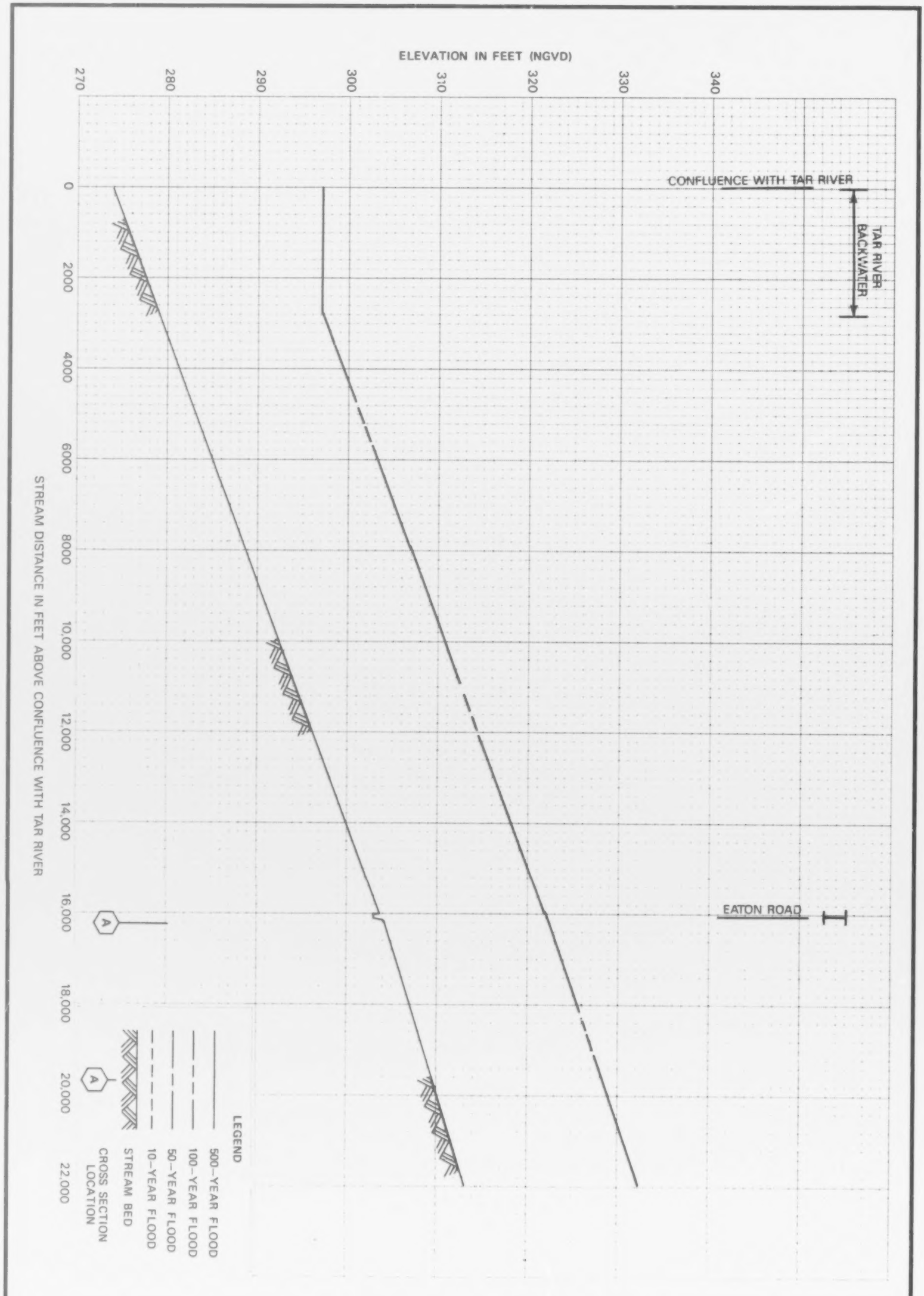
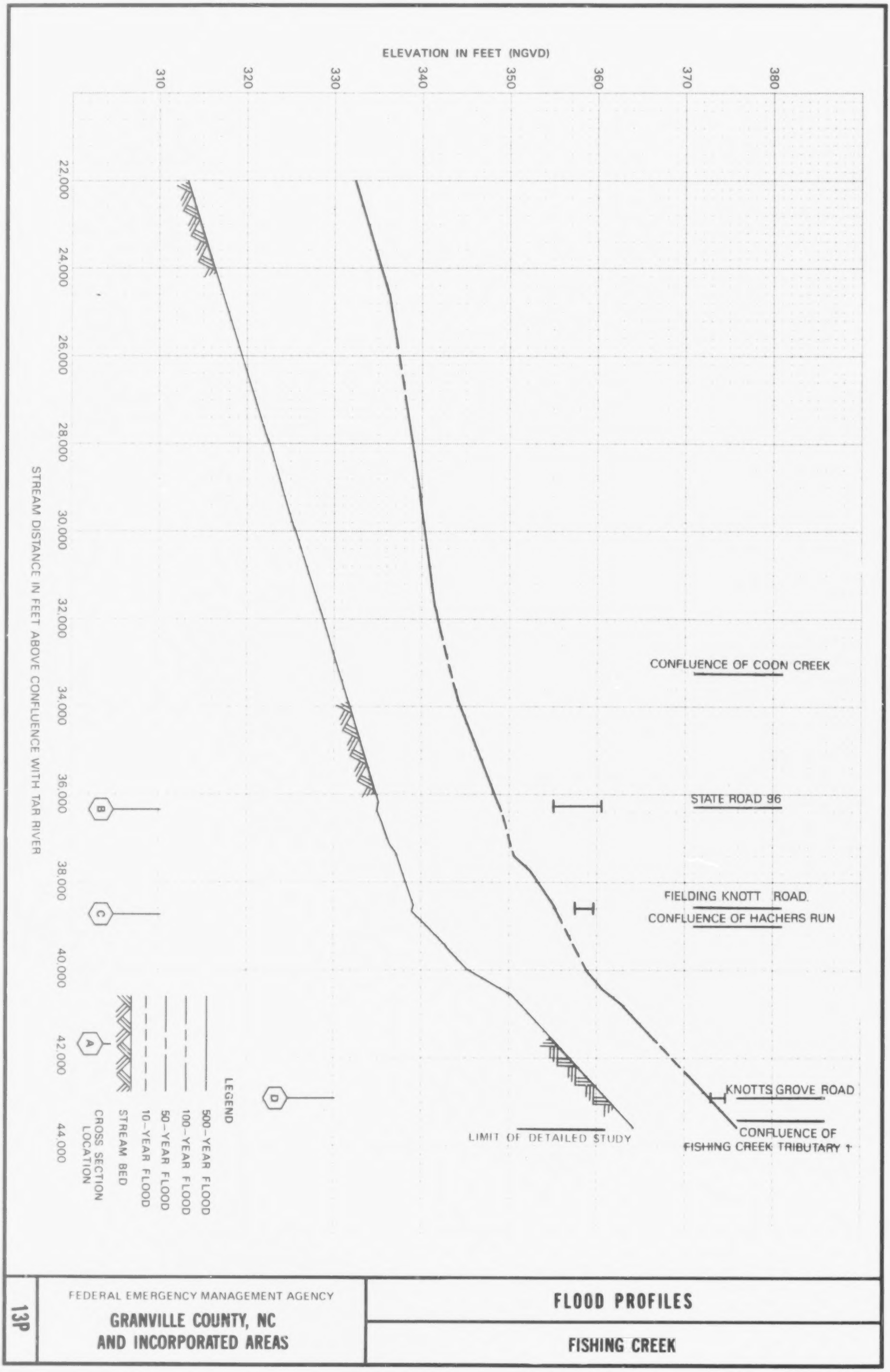


12P	FEDERAL EMERGENCY MANAGEMENT AGENCY GRANVILLE COUNTY, NC AND INCORPORATED AREAS	FLOOD PROFILES FISHING CREEK



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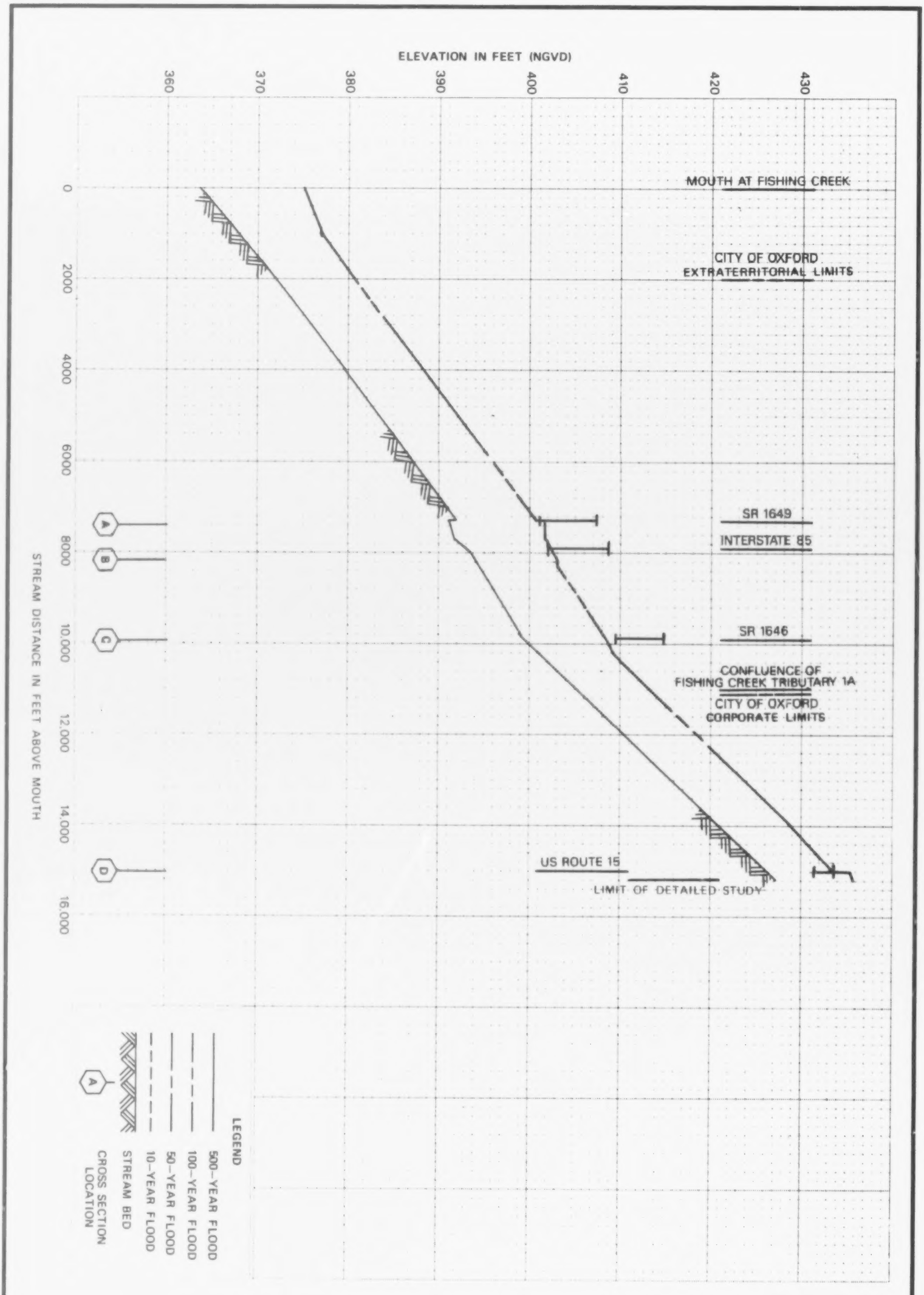

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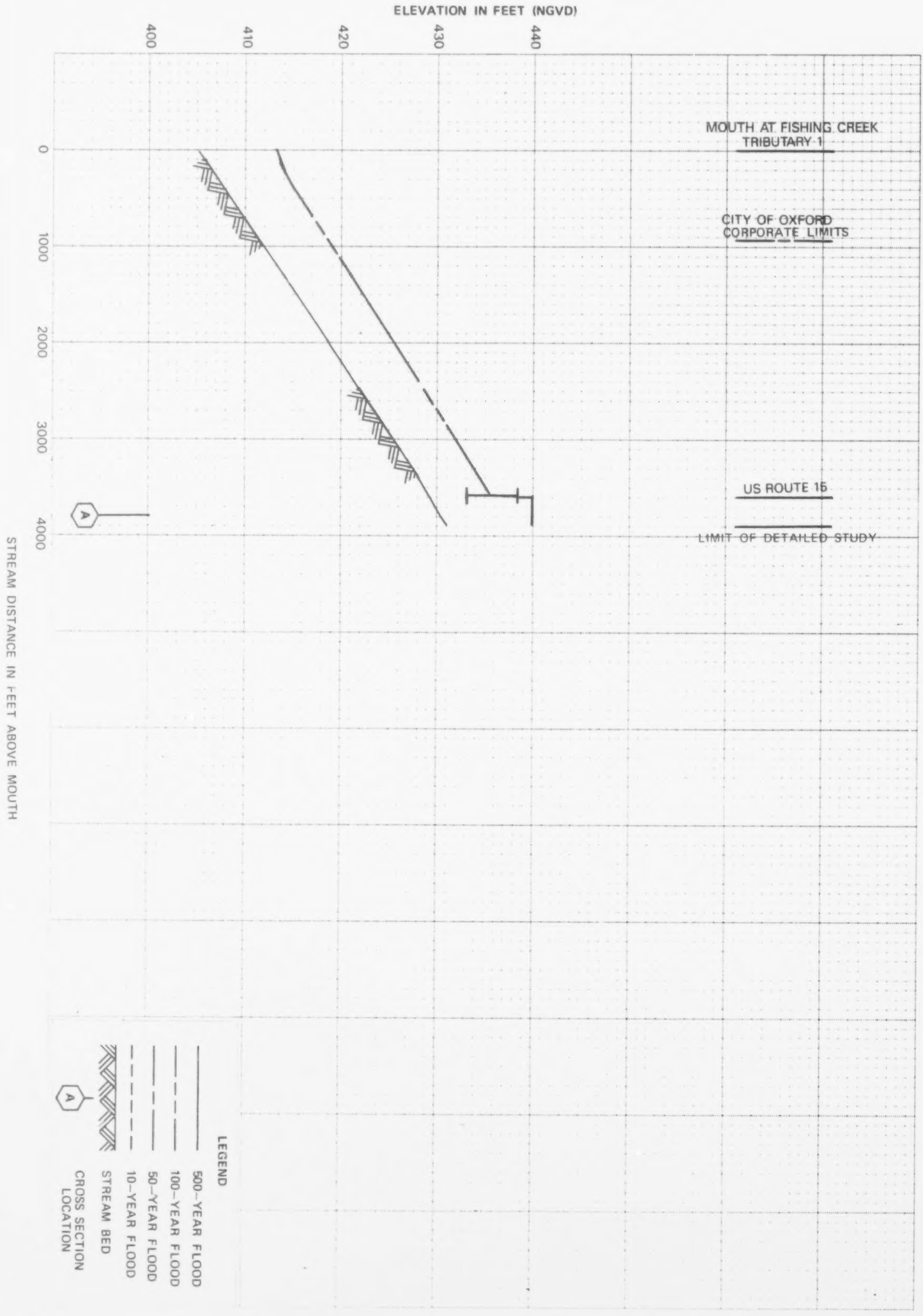

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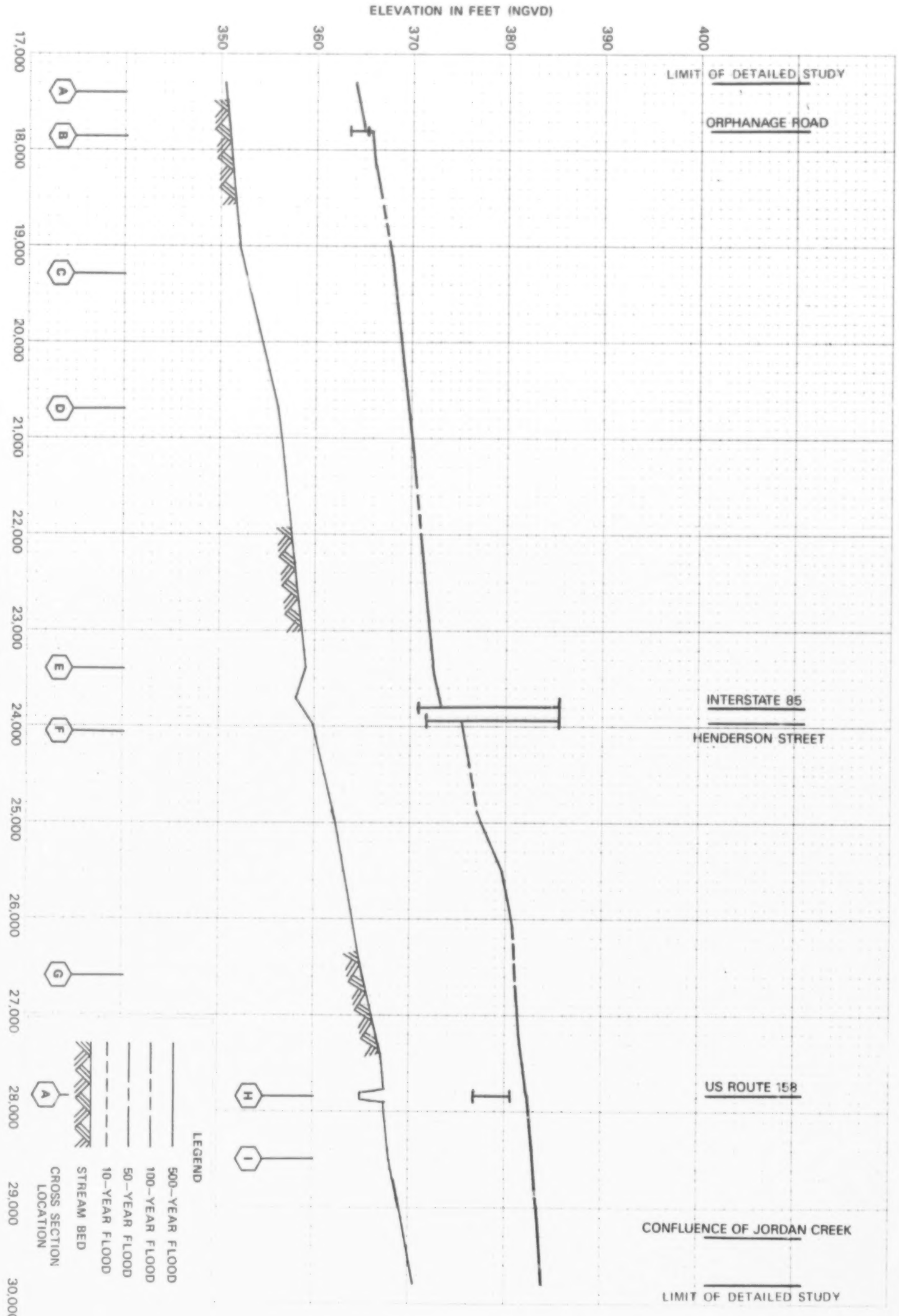


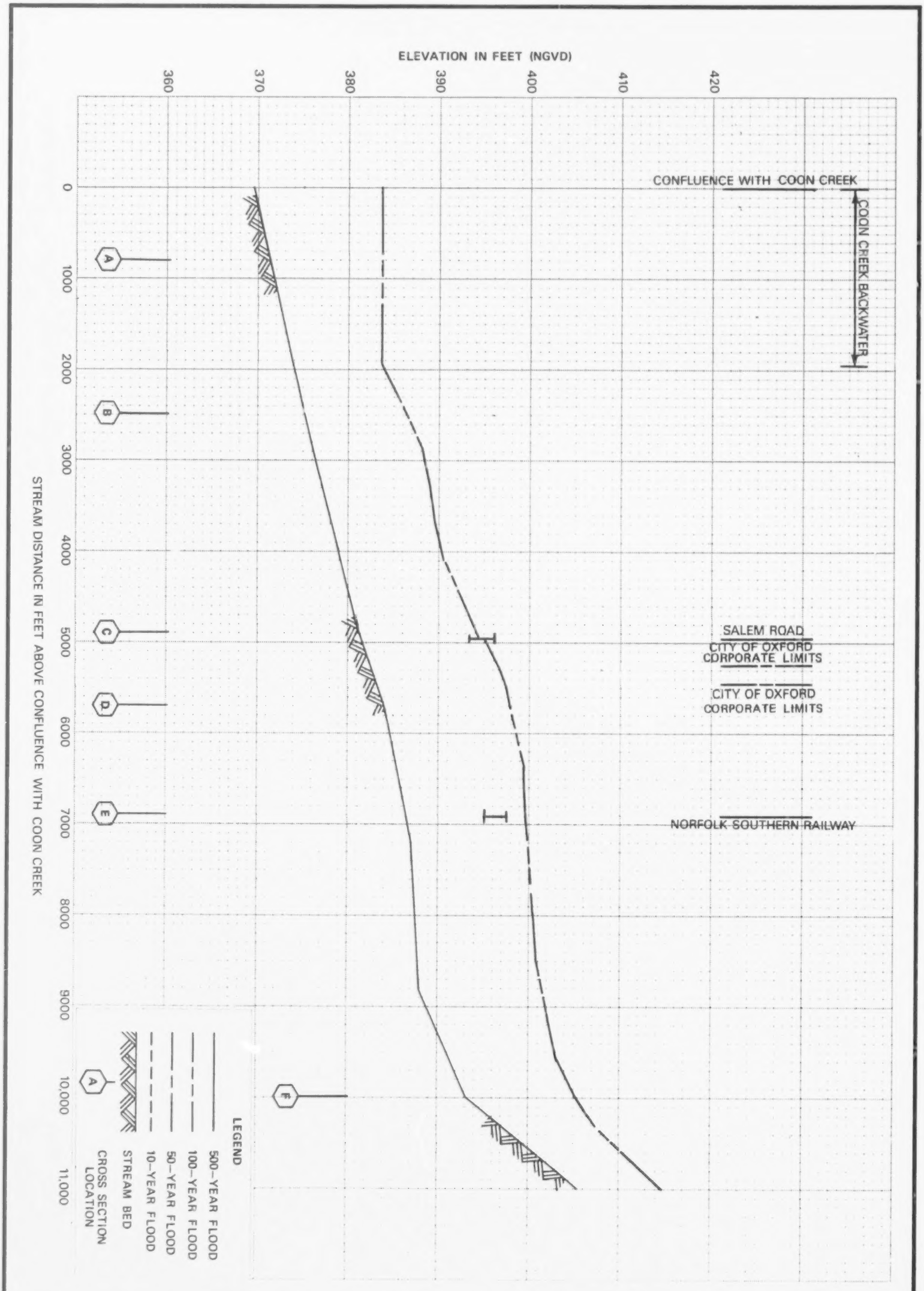
16P

FEDERAL EMERGENCY MANAGEMENT AGENCY

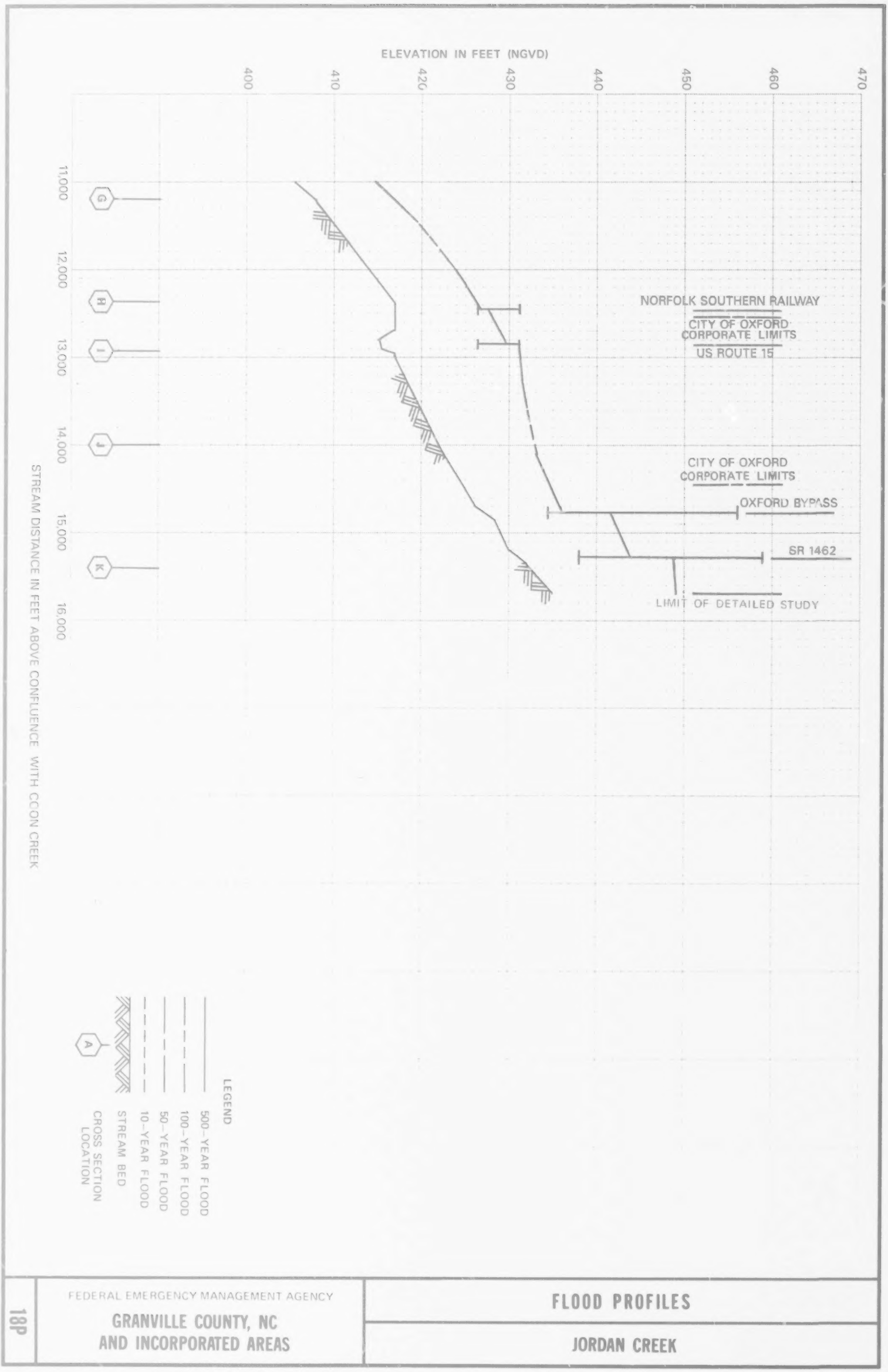
GRANVILLE COUNTY, NC
AND INCORPORATED AREAS

FLOOD PROFILES

COON CREEK



17P	FEDERAL EMERGENCY MANAGEMENT AGENCY GRANVILLE COUNTY, NC AND INCORPORATED AREAS	FLOOD PROFILES JORDAN CREEK



18P

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE COUNTY, NC
AND INCORPORATED AREAS

FLOOD PROFILES

JORDAN CREEK

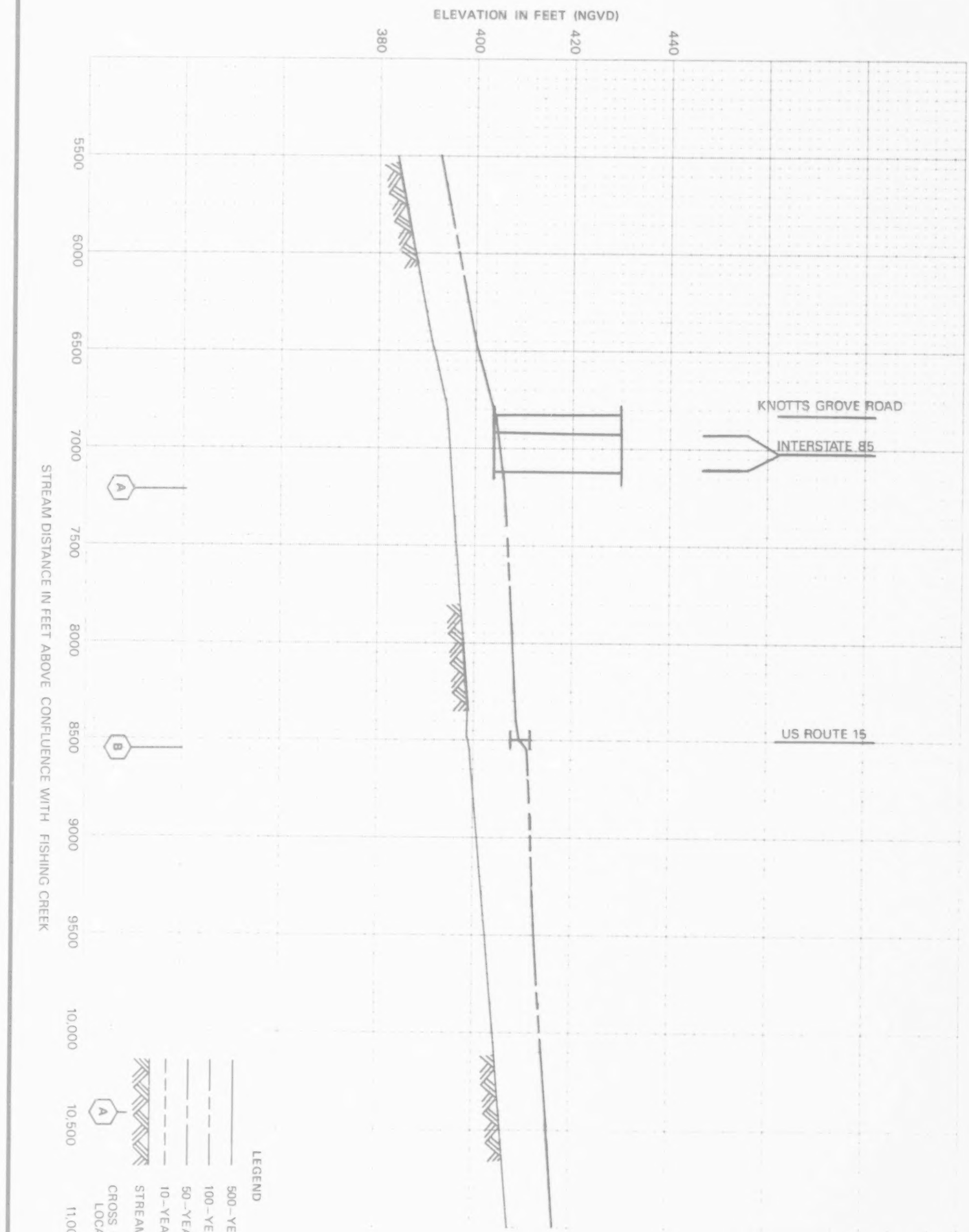
FLOOD PROFILES

HACHERS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

GRANVILLE COUNTY, NC
AND INCORPORATED AREAS

19P



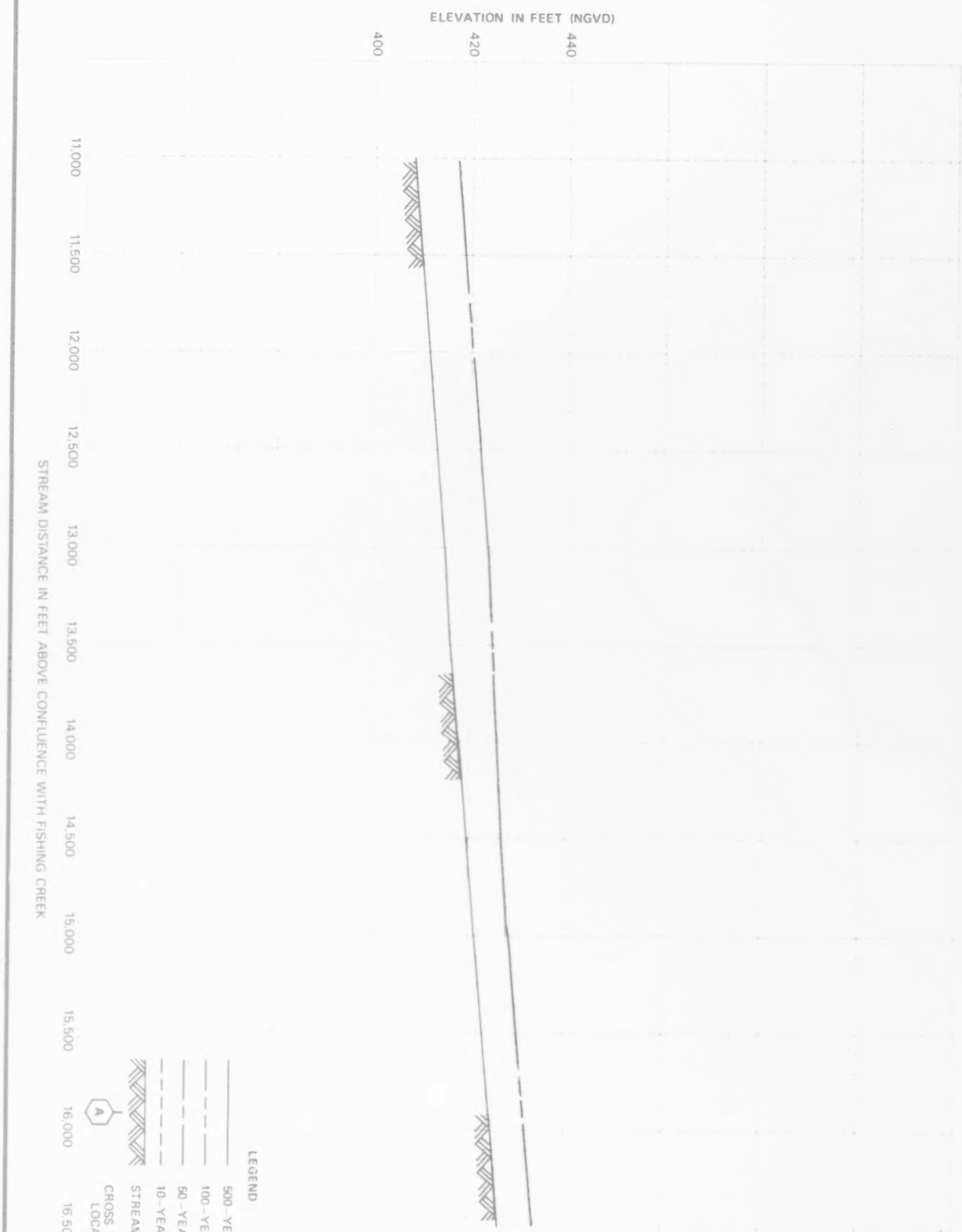
20P

FEDERAL EMERGENCY MANAGEMENT AGENCY

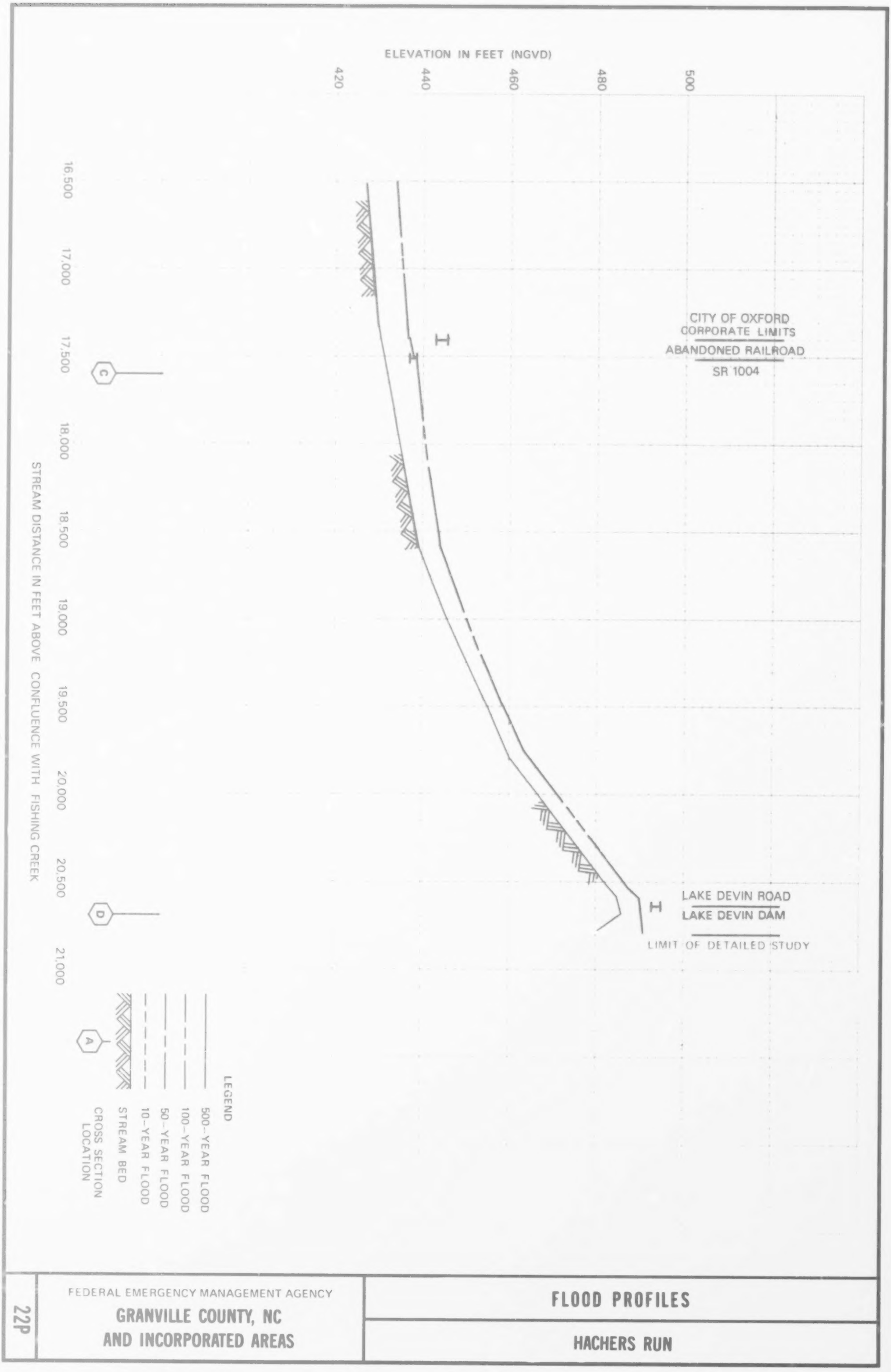
GRANVILLE COUNTY, NC
AND INCORPORATED AREAS

FLOOD PROFILES

HACHERS RUN



21P	FEDERAL EMERGENCY MANAGEMENT AGENCY GRANVILLE COUNTY, NC AND INCORPORATED AREAS	FLOOD PROFILES HACHERS RUN



22P	FEDERAL EMERGENCY MANAGEMENT AGENCY GRANVILLE COUNTY, NC AND INCORPORATED AREAS	FLOOD PROFILES HACHERS RUN